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ARTHUR C. JONES, M.D.

Portland, Ore.

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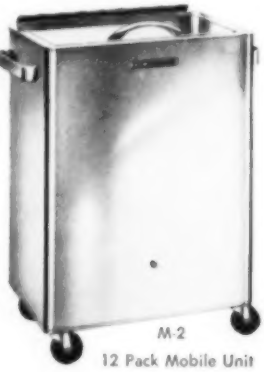

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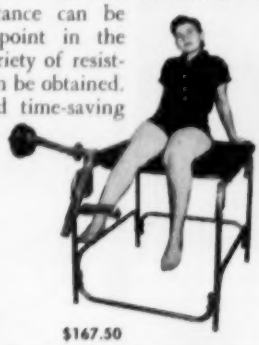

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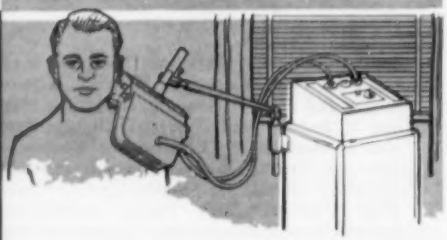

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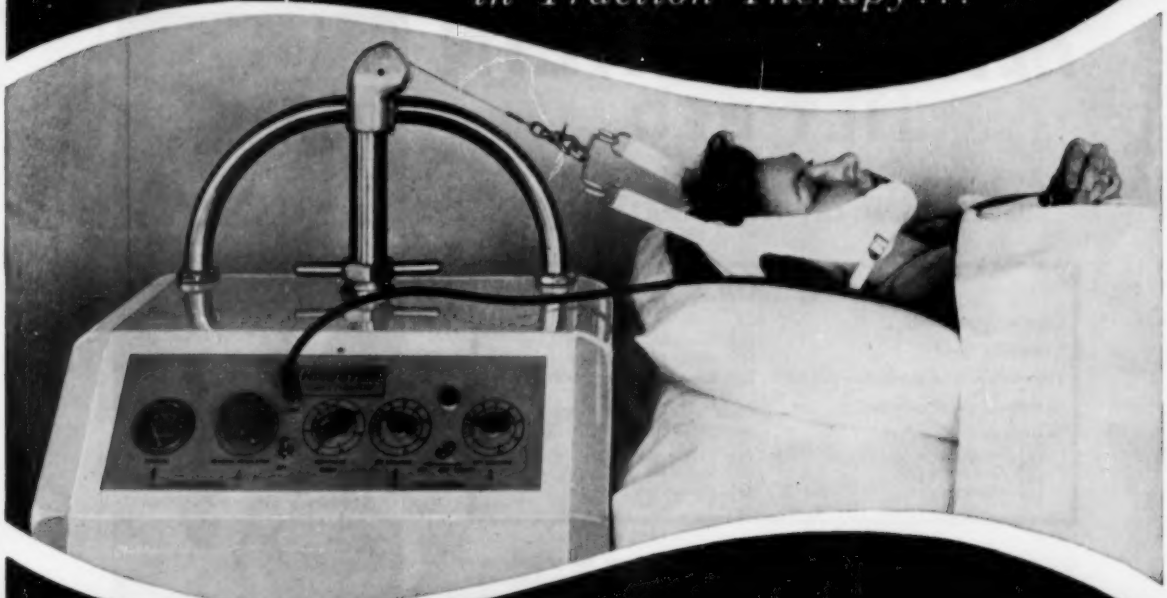

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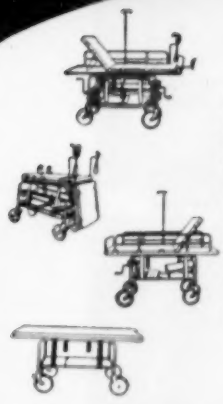

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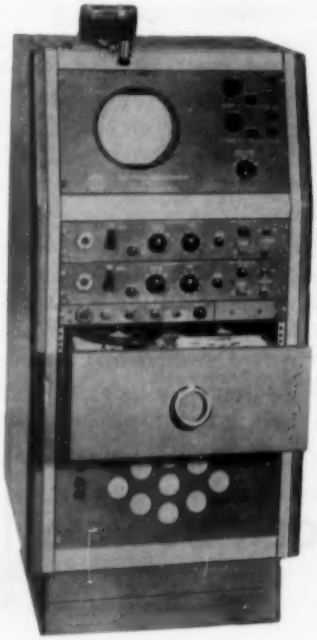

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Pneumatic Pulsatile Mobilization: A Possible Method of Motor Rehabilitation in the Pharynx Area

James F. Bosma, M.D.
Salt Lake City

The accumulation in a number of patients having residual difficulty of deglutition and speech following bulbar poliomyelitis[1] and the comparative lack of rational and effective therapy for the relief of these disabilities have led to experimentation with imposed variations of air pressure within the cavities of the mouth, pharynx, and larynx. The local effects of alternating inflation and deflation upon these cavities and upon adjacent structures concerned with their contour and motor performance have been observed by cinema and cinefluorographic methods.

The possible application of this form of therapy to clinical problems of motor rehabilitation in the area of the pharynx is discussed. Apparent contraindications to this mode of therapy are described. The general problems of evaluations of this type of clinical maneuver are recognized.

Method

The activation apparatus consists essentially of a motor-driven pump joined to the subject by a semirigid hose and a mask covering mouth, nose, or both orifices. Patient tolerance of this procedure was found to be optimal if humidified oxygen was fed into the inlet of the pump at 2 or 3 liters per minute. A greater flow of oxygen caused symptoms of suffocation or of aerophagia. After experimentation, a pump varying in chamber volume by 10-12 cc. at a choice of rate from 15 to 30 per minute in a sinusoidal pattern was found optimal for patient comfort and the related maneuvers of controlling the air stream which the patients were directed to employ.*

*The original model and early adaptations of this apparatus were designed and constructed by Mr. Kenneth Nielsen. Later, standardized models were provided by the J. H. Emerson Company, Cambridge, Mass.

Clinical Observations

This pulsation-mobilization of the mouth-pharynx-larynx area has been employed over a period of two years in a clinical project study of poliomyelitic impairment in the bulbar area.[1-3] During this time, it was employed intensively in three to six therapy periods per week in 12 patients, for a total of 32 patient months.

The variety of potential motions resulting from application of these pressure variations is indicated in figures 1, 2 and 3. Smaller quantity of oxygen flow and lower frequencies of sinusoidal variation were applied through the nasal mask. The patient could be taught to control the stream at the nasopharyngeal isthmus (fig. 1) or at the larynx, and there was comparatively little motion of

Fig. 1 — Pulsatile mobilization. Diagram of motions observed during pneumatic mobilization in bulbar area. Mask over nose only, and airstream modulated at palatopharyngeal isthmus. Solid lines indicate typical position at deflation; dotted lines at inflation. Isthmus is alternately expanded or closed by converging palate and epipharyngeal walls.

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the hyoid and larynx. In this circumstance, the retro-oral portal[1] was typically closed without further instruction or effort.

As the air stream was applied via oral or oral-nasal mask, the patient could be taught to valve or control the stream at the lips, by the tongue within the mouth cavity, at the retro-oral portal, or at the larynx (figs. 2 and 3).

Special adaptations and assistance were required in patients having extensive weakness in this region. Thus, with marked weakness of the levators of the mandible or the hyoid, it was necessary to provide for their external support by means of a strap or sling. In the circumstance of marked weakness of the levator muscles of the palate, a prosthesis was provided for support of the muscular palate.

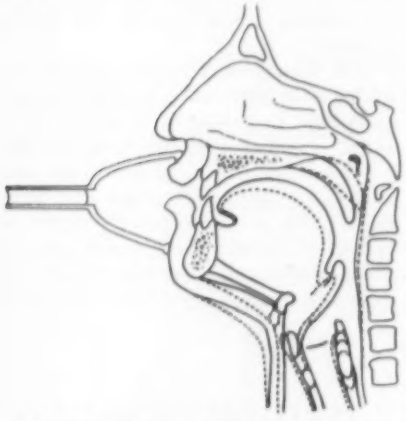

Fig. 2 — Pulsatile mobilization. Diagram of motions observed during pneumatic mobilization in bulbar area. Mask over mouth only, with lips and oral cavity open and airstream occluded at larynx.

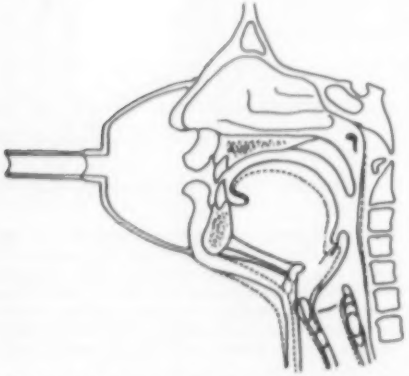

Fig. 3 — Mask over nose and mouth. Motions as in figure 2, with exception of lesser motions in area of isthmus.

The patients experienced a variety of remote or systemic effects of this procedure. If excessive rate of alternation of the air stream or excessive duration of utilization were employed at first application, the patients at times experienced typical vascular hypotensive symptoms, including faintness and vertigo. As in the comparable circumstance of intermittent positive pressure breathing, there was no clinical evidence of continued or recurrent vascular variations. In some, oral and pharyngeal secretions increased in volume and required additional aspiration. A distinct increase in tracheobronchial secretions was also noted.

Discussion

A heterogenous variety of arrangements is employed for therapy of respiratory problems by intermittent positive or negative pressure applied to the respiratory system through the nose or through the nose and mouth. These physical modifications of the internal environment are typically intended as therapy of inflammatory and secretory disorders, except in those comparatively infrequent circumstances of respiratory deficiency in which the basic process of respiration is thus accomplished or facilitated. More recently,[4-7] intermittent positive pressure breathing has been utilized in chronic pulmonary disease.

The method and procedure here described are adapted to a different purpose — that of mobilization of the intrinsic and supporting musculature in the mouth, pharynx, and larynx. It also provides an airstream upon which the valvular mechanism normally involved in swallow, respiration control, and speech can be exercised. Thus, this procedure is an adjunctive technic to speech therapy and physical therapy concerned with this area. The prescription and guidance in utilization of this procedure should be an individual matter in each instance, depending upon the particular pattern of motor disability which the

patient currently demonstrates. In those patients in whom paralysis of poliomyelitic or analogous etiology has already caused a pathological distention or expansion and an anatomical displacement, such as inferiorward displacement of the palate, or of the tongue-hyoid-larynx composite, or of the mandible, this procedure is specifically contraindicated unless external support is provided by means of a sling or similar arrangement.

In its proper utilization in selected patients, this method has apparently been of clinical benefit, in that improvement in motor function was observed in the pharynx area in patients in whom disability had apparently been static for long periods of time following acute poliomyelitis.[3] An important consideration in an evaluation of this nature is that the patients under observation received additional speech rehabilitation measures and specialized physical therapy to the submental and cervical areas. They were also subjected to multiple elements of stimulation and satisfaction, and the implications and prospects of achievement were much enhanced. Thus, the effect of this procedure has not been objectively and separately demonstrated. Its further utilization will depend upon its seemingly appropriate rationale, simplicity, and accessibility until such further objective evaluation can be achieved by comparison observation in a variety of clinical situations.

Summary

In attempted therapeutic substitutions for the physiological variations in intraluminal pressures within the poliomyelitis-paralyzed mouth, pharynx, and larynx, an apparatus has been devised which provides periodically varied pneumatic volumes and pressures, applied to this area through an oral or oral-nasal mask. The patient contains or modulates the pulsing column of air to cause successive inflation and deflation of mouth alone, of mouth and pharynx, or of the entire respiratory tract.

In general clinical impression, this procedure is of therapeutic value as an adjunctive measure in a general program of rehabilitation of the mouth-pharynx-larynx area.

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Physiology of Skeletal Muscular Circulation: A Review

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A knowledge of the basic physiology of the circulation in skeletal muscle is of interest to the physiatrist. Considerable research has been done in this field in recent years. A major part of the work to be reviewed here has appeared in two reviews on related topics[1, 2] and the interested reader would find them profitable reading.

Anatomic Consideration

With the aid of modifications of the Clark window, microscopic studies of the circulation in minute vessels in various tissues have been made. There are many subtle adaptations of the microcirculatory anatomy in different tissues so that it cannot be safely assumed that the findings in one tissue will be present in another. Thus, there are many arteriovenous anastomoses in human skin and in the intestinal wall but few, if any, in skeletal muscle or in mesentery.

Zweifach and Metz[3] reported observations on the skeletal muscle of the rat. They mentioned arteriolar arcades from which metarterioles branch at right angles. These in turn divide into capillaries which lie on the surfaces of small bundles of muscle fibers about 50 to 60 microns in diameter. The capillaries lie along the long axis of the muscle fibers and are 40 to 50 microns apart.

A phenomenon reported by most of those making direct observation on the minute vessels is "active vasomotion." This is an intermittent ebb and flow of the blood through the network because of the opening and closing of metarterioles and precapillary sphincters. Nicoll and Webb[4] expressed the view that the slow vasomotion changes are mainly due to local changes in the tissues. The faster vasomotion changes are probably due to neural influences since they are abolished by denervation. They suggested that active vasomotion may be the main determinant of capillary pressure. The smaller arterioles in the bat wing have little or no dependence on nervous control, while the precapillary sphincters are most independent of all the minute vessels. Capillaries may show passive deformation but no active changes. Peristaltic waves have been observed in the smaller arterioles and venules of the bat wing. The venular peristalsis is of variable efficiency owing to variable coordination with coalescing branches or other segments of the same vessel.

The rate of flow through the minute vessels is related to the perfusing pressure, as demonstrated for the forearm by Burton and Yamada.[5] They estimated the dilating pressure within the vessels from the difference between the arterial blood pressure and the pressure of the tissues outside the vessels. This difference they called the "transmural pressure," and they varied it by the application of pressures greater than atmospheric to the part of the limb within the plethysmograph. They found the relationship between blood flow and the transmural pressure to be approximately linear through most of the range studied from normal to lesser values. However, as the transmural pressure reached lower values there was a rapidly progressive decrease in blood flow, and the blood flow stopped while the transmural pressure still had a value of 20 to 40 mm. Hg. The value for the transmural pressure at which the blood flow stopped they called the "critical closing pressure." They pointed out that it makes no difference whether the transmural pressure is reduced by an increase in externally applied pressure or a decrease in intravascular hydrostatic pressure.

Burton and Yamada also showed that the critical closing pressure is reduced by

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thermal reflex vasodilatation. Yamada[6] found that the same relationships are demonstrable in the digits where the circulation is principally cutaneous. The critical closing pressure seems likely to be of importance in the regulation of blood flow through the minute vessels. The vessels that "close" apparently are the arterioles. At high transmural pressures the flow becomes independent of pressure, but at low transmural pressures a small change in intravascular pressure can produce a major change in flow. In this range there is a delicate balance between the "tone" of the vascular smooth muscle and the hydrostatic pressure within the vessel, and a small change in either factor in the appropriate direction may stop the flow through the vessel.

Methods of Measurement of Blood Flow in Skeletal Muscle

Cannulation. — Cannulas may be inserted in appropriate vessels to measure directly the arterial inflow or the venous outflow. Flow in skin and muscle may be measured separately by ligation of the part of the distribution that is to be excluded. The limb may be skinned in order to eliminate the cutaneous blood flow. The blood flow may be measured by a variety of flow meters. Usually, but not always, general anesthesia is used with cannulation technics. This, as well as the surgical procedures, would be expected to have some influence on the response of the vessels.

Venous Occlusion Plethysmography.— Venous occlusion plethysmography is based on the premise that if the venous return from a limb or a portion of a limb is occluded, the rate of increase in volume of the occluded segment, for the first few heart beats following occlusion, will equal the arterial flow. This method can be applied without anesthesia to the intact individual but does not separate the blood flow to muscle, skin, and bone. The proponents say that the major blood flow in the forearm or leg is muscular, while that of the hand or foot is mainly cutaneous. A comparison of the effects of a procedure on two such regions as the forearm and the hand should give a clear indication of what is happening to the muscular and cutaneous circulations.

Heated Thermojunctions. — These operate on the theory that thermal conductivity in muscle varies directly with the blood flow. The "calorimetersonde" of Hensel, Ruef, and Golenhofen[7] is such a device which may be inserted into muscle. The tip is heated. The temperature difference between the tip and a point 10 mm. proximal to the tip is related to the thermal conductivity of the tissue in which it is embedded. Similar principles may be used in estimating cutaneous blood flow. A very small site is evaluated at one time by such an instrument.

Clearance of Radioactive Sodium. — Kety[8] found that the normal washout of a deposit of $Na^{24}Cl$ in muscle is about 5 per cent per minute. This gives a simple exponential curve from which a "clearance constant" may be obtained. The rate of clearance in normal muscle is increased with reactive hyperemia and after exercise.

Walder[9] found in postexercise hyperemia that the clearance returned to normal values after 1 or 2 minutes, though the blood flow remained elevated for 6 or more minutes. Obvious changes in blood flow through muscle in response to intravenous administration of epinephrine were not accompanied by changes in clearance. He found a critical level of blood flow in skeletal muscle below which there is no clearance of Na^{24}.[10] At flow rates above the normal maximum, a maximal clearance may be attained. These findings suggested to Walder that the clearance rate for radioactive sodium is related more to the interface area between the capillaries and the tissue space than to blood flow. He suggested, however, that in between the critical minimal and maximal levels of blood flow the clearance method can be calibrated by plethysmography in the immediate postexercise period and then used for absolute values of blood flow.

Temperature Measurements.—Changes in muscle temperature are a poor index of blood flow through muscle. Muscle temperature usually varies directly with blood flow. However, because of the inconstancy of the temperature of arterial blood,[11] it cannot be assumed that changes in blood flow will have a pre-

dictable effect on muscle temperature. Furthermore, if the part is being heated there may be a substantial rise in temperature before there is a change in blood flow, and blood flow may continue to rise after the temperature has begun to fall.[12]

Regulation of Circulation in Skeletal Muscle

Intrinsic Muscular Regulation. — The phenomenon of "active vasomotion" of the smooth muscle fibers of the blood vessels has already been mentioned. This independent unsynchronized contractility accounts for the basal vasomotor tone.[2] Folkow pointed out that vessels engaged in centrally controlled reactions, such as regulation of temperature and blood pressure, show insignificant myogenic activity. An example is the cutaneous arteriovenous anastomosis. However, other vessels, such as those of the brain and myocardium, make very little response to central direction, and elimination of their nerve supply has little effect. In such tissues the basal tone is equated against local metabolic vasodilators. This concept is further supported by Burton and Yamada's observations on the influence of reflex vasodilatation on the critical closing pressure.[5] Folkow[2] pointed out that "no tissue is completely defenseless against a centrally induced restriction of blood flow."

Neurogenic Regulation. — Sympathetic Vasoconstrictors: Folkow[2] reported that some of the ganglionic synapses of the thoracolumbar outflow are very close to the ventral roots instead of being in the ganglionic chains. In such instances even total extirpation of the chain will not produce total sympathectomy. It could be that some of these synapses are displaced to the periphery, but this is not known to be so. Hillarp[13] expressed the belief that the postganglionic neurons and smooth muscle cells are arranged in motor units but with pronounced convergence and divergence.

Barcroft and Swan[1] reviewed the evidence, from plethysmographic studies, for the existence of sympathetic vasoconstrictor fibers in skeletal muscle. Reflex vasodilatation by heating of a remote part of the body not only elevates skin temperatures but increases blood flow in predominantly muscular regions such as the forearm. Blocking of the deep nerves produces a similarly large increase in blood flow of the forearm, while blocking of the cutaneous nerve supply produces a similarly small increase in blood flow. If cutaneous vasodilatation is prevented by epinephrine iontophoresis, the increase in total blood flow on blocking of the radial, median, and ulnar nerves is very little affected. Blocking of these nerves in the chronically sympathectomized limb (which has regained partial vasomotor tone) results in no increase in blood flow. The only explanation for all these observations is that there are sympathetic vasoconstrictor fibers going to the vessels of skeletal muscle with the major nerves.

Sympathetic Vasodilators: Barcroft and Swan[1] reviewed observations on peripheral blood flow in the forearm during fainting. They reported a fall in blood pressure accompanied by an increase in blood flow in the forearm. At the same time the skin is blanched so that the increased blood flow cannot be in the cutaneous circulation. An increase in blood flow in the presence of a reduced perfusing pressure establishes the occurrence of a muscular vasodilatation during the faint. The phenomenon does not occur in the acutely sympathectomized limb, which implies that it must be mediated by sympathetic vasodilator fibers. Skeletal muscle is the only tissue definitely known to possess sympathetic vasodilator fibers.

It has been suggested that the sympathetic vasodilator fibers to skeletal muscle may be concerned with the vasodilatation accompanying muscular activity.[14] This vasodilatation occurs almost simultaneously with the muscular activity, which suggests that it is neurogenic rather than induced by local metabolites. The fact that, in the cat, these fibers can be activated from the medulla, hypothalamus, or even the motor and premotor cerebral cortex lends support to this concept. After the vasoconstrictor fibers have been inactivated some basal vasomotor tone still exists. However, the vasodilator fibers can cause five or six

times as much blood flow through "active vasodilatation."[2] This effect can be blocked by small amounts of atropine, which have no effect on the dilatation brought about by elimination of the sympathetic vasoconstrictor fibers.

The rate of discharge of impulses in the sympathetic system is relatively slow. Impulses from 30 per minute to 10 per second cover the full range of vasoconstriction in skeletal muscle.[2, 15] It is thought that normal tone is maintained by 1 or 2 impulses per second with maximal tone at 6 to 8 per second.

Celander and Folkow[16] stated that, since cutaneous vasomotor tone is lower than muscular vasomotor tone, the cutaneous vessels can be constricted more strongly. The cutaneous vessels also have more constrictor nerve fibers. Since the metabolism of skin is lower than that of muscles, the cutaneous vessels can remain constricted longer. They said that there are no cutaneous vasodilator fibers, but Hurley and Mescon[17] reported that there are cholinergic fibers to the arteriovenous anastomoses in human skin which probably have a vasodilator effect on these structures.

The dorsal-root vasodilator nerves once postulated by Bayliss are no longer believed to exist. The only type of vasodilatation connected with the dorsal roots that has been demonstrated is the axon reflex.

Venous Regulation. It is believed that there are sympathetic vasoconstrictor fibers to veins.[2] The venomotor changes postulated by Bazett and colleagues[11] as a mechanism in temperature regulation would be an example of a centrally regulated change in venomotor tone. Temperature changes in arterial blood provided the indirect evidence to suggest that, in a cold environment, the superficial veins are closed. The cold blood from the acral parts passes back toward the trunk in the venae comitantes beside the major arteries, picking up heat from the arterial blood and thus conserving body heat. In a hot environment, the acral blood returns through superficial veins, allowing it to cool further and permitting the arterial blood to reach the acral regions without being precooled.

Yamada and Burton[18] reported a venivasomotor reflex observed in efforts to increase the transmural pressure in the peripheral vessels. Under circumstances of a reduced atmospheric pressure over the digits they found a decrease in arterial inflow. They postulated that the stretching of the thin venous walls by an increased transmural pressure activates stretch receptors and produces a reflex arteriolar constriction. They pointed out that this is a stable reflex mechanism which can never stop the blood flow completely because of its "negative feedback" nature.

Sympathectomy: The effects of sympathectomy are divided by Barcroft and Swan[1] into early and late changes. The early changes are more marked in the hand than in the foot, which indicates that cutaneous circulation is more involved than that of muscle. There is no difference between preganglionic and postganglionic sympathectomies. The blood flow in muscle does not always reach its maximum immediately, but usually within the first 2 days it reaches a maximum and then gradually drops off to a value a little above the preoperative level. Despite this the skin remains warm — another example of the failure of temperature to reflect blood flow. The reason for this return of vascular tone is not known. The vessels are supersensitive to circulatory epinephrine, but Barcroft and Swan say that it has not been shown that this is the mechanism involved.

The late changes after sympathectomy are those found 1 to 2 years postoperatively. At this time the vascular reflexes have returned, in part, even in most of those in whom they were absent 6 months after operation. Thus the vessels respond to indirect heating by reflex vasodilatation, although imperfectly. Barcroft and Swan pointed out that they are still more like sympathectomized than normal vessels. Furthermore, despite this turn of events, there remained a good relief of the symptoms for which the sympathectomy was performed in 14 of the 18 patients in whom the vascular reflexes returned.

Humoral Regulation.—Epinephrine: Many observations in the past have been

invalid because excessive doses of epinephrine were used. Furthermore, the effects of intra-arterial injection differ from those of intravenous injection, and different vascular beds have different responses.

The intravenous injection of epinephrine produces a transient vasodilatation in skeletal muscle, which is followed by a more sustained but lesser increased blood flow. The mechanism of the transient vasodilatation is unknown, but it occurs after sympathectomy and also with intra-arterial injections.[1]

The sustained vasodilatation does not occur after intra-arterial injection of epinephrine. It will occur in the acutely sympathectomized limb but not in a chronically sympathectomized limb. It is believed to be due to some substance other than epinephrine which is liberated by the passage of epinephrine through the body when it has been injected intravenously. Some evidence points to the idea that the epinephrine accelerates the metabolism of carbohydrate, which results in the formation of more lactic acid, and that lactic acid is the vasodilator substance. Barcroft and Cobbold[19] found a concomitant increase in blood lactate paralleling the sustained vasodilatation, although there was no change in the level of blood lactate with the transient vasodilatation. Excessive rates of infusion of epinephrine may mask the dilatation effect. In the acutely sympathectomized limb there is also another secondary rise in blood flow which has not been explained.[2]

NOREPINEPHRINE: Norepinephrine is purely a vasoconstrictor in skeletal muscle. It is a vasoconstrictor in most other vascular beds. Both epinephrine and norepinephrine accelerate the heart. The net effect of epinephrine is to raise the systolic blood pressure and lower the diastolic blood pressure, with no change in the mean pressure. However, norepinephrine, being a vasoconstrictor generally, elevates both the systolic and the diastolic pressure.[1] It has been suggested that norepinephrine is probably the true sympathetic humoral mediator.[1, 2]

Infusions of mixtures of epinephrine and norepinephrine show a domination of the epinephrine effect in mixtures in which up to 75 per cent of the two drugs is norepinephrine. With higher proportions of norepinephrine, a vasoconstrictor effect prevails.[1] Because of the multiple effects of these hormones on various vascular beds and secondary compensatory reflexes which may occur, Celander[15] pointed out the fallacy of using blood pressure as an index of their vasomotor effects. A more direct measurement of the particular vascular bed with which one is concerned is necessary.

Generally speaking, in the skin and renal circulations both hormones are vasoconstrictors, but epinephrine is more powerful. In the vascular bed of the liver, epinephrine is a vasodilator and norepinephrine has no effect. In the brain, epinephrine is a weak vasodilator and norepinephrine a weak vasoconstrictor.[1]

Celander[15] reported an extensive experimental study in which he showed, among other things, the relative merits of the injection of epinephrine and norepinephrine and of stimulation of the sympathetic trunk or the splanchnic nerves to the adrenal medulla. The principal observation by Celander on all the major vascular beds he studied was that the neurogenic control was much more potent than the humoral control by way of splanchnic stimulation of the adrenal medulla or by injection of the hormones. He expressed the view that sympathin does not exist and is some sort of artifact in older experiments suggesting its presence. The overflow of sympathetic mediator from activated endings as a means of producing sympathetic effects in the near or remote neighborhood can be ignored, he said.

Celander suggested that the principal regulation of the vessels for homeostatic purposes is by way of the sympathetic innervation. The adrenal medullary catechols probably serve in metabolic actions in tissues which have no direct sympathetic innervation. Very minute amounts of epinephrine will accelerate the breakdown of glycogen to dextrose in the liver and of glycogen to lactic acid in skeletal muscle. Norepinephrine has almost no influence on these metabolic processes and is a powerful vasoconstrictor. Celander expressed the view

that the vasomotor component is under control of the sympathetic nerves and that norepinephrine is the mediator. Epinephrine comes from the adrenal medulla and has a metabolic function.

CHANGES IN HYDROGEN-ION CONCENTRATION: Attempts by Deal and Green[20] to study the comparative effects of pH changes in cutaneous and muscular vascular beds have shown that these are not very marked in the pH range from 7.0 to 7.65. On the acid side of normal, there is a tendency to vasodilatation in skin and muscle. On the alkaline side, they reported vasoconstriction in the skin and vasodilatation in the muscle.

Effects of Exercise on Blood Flow in Skeletal Muscle

It has been observed[1] that a strong grip can be maintained as long with circulatory arrest as without it, whereas a weak grip cannot be so maintained. This suggests that in strong, sustained muscular contraction the circulation is in effect arrested. Further confirmation is found in the experiments observing temperature changes in warmed and cooled muscles with and without arterial occlusion. With a weak, sustained contraction of the triceps surae in the intact human being with the limb immersed in water at 32 or 42 C., the temperature of the muscle, which has been in the neighborhood of the water temperature, changes during the contraction toward blood temperature. With the circulation occluded during the weak, sustained muscular contraction, the "warm muscle" in water at 42 C. becomes warmer, while the "cold muscle" in water at 32 C. remains at about the same temperature as before the exercise. When the circulation is reestablished, there is a sudden change of the muscle temperature toward blood temperature. It is followed by a gradual return toward the water-bath temperature. The response with a strong, sustained muscular contraction, with or without the circulation occluded, is essentially the same as that with a weak, sustained contraction with the circulation occluded. Rhythmic exercise was considered to make measurements of blood flow with the plethysmograph impossible until a method was evolved by Dornhorst, according to Barcroft and Swan.[1] With this method, it has been possible to demonstrate a spurting sort of blood flow during rhythmic exercise with an over-all hyperemia.

Muscular exercise exerts a powerful pumping action on the venous blood.[1] It has been shown plethysmographically that blood which accumulates in an extremity encircled by a cuff inflated to a pressure of 90 mm. Hg can easily be forced past this occluding cuff by muscular exercise.

The postexercise blood debt is usually considerably overpaid. The fact that this repayment is unaffected by sympathectomy, when allowances are made for differences in resting blood flow, is interpreted to mean that the circulatory centers in the central nervous system have no effect on postexercise hyperemia. It is suggested that there is a dual control of muscular circulation: a nutritive one regulated by local metabolites, and an anastomotic one regulated by the nervous system.

Summary

The regulation of the circulation of blood to skeletal muscle is based upon three mechanisms: (1) the phenomenon of "active vasomotion," which is regulated both by local metabolites and by the sympathetic nervous system; (2) the sympathetic nervous system, which supplies the vessels to the muscles with both constrictor and dilator fibers; there are also sympathetic constrictor fibers supplying the veins; and (3) humoral control by the adrenal medullary catechols. Norepinephrine is believed to be the chemical mediator liberated by the sympathetic nerve endings. Epinephrine is believed to act primarily by stimulation of carbohydrate metabolism as a result of which the level of blood lactate is increased. The lactate may be the ultimate vasodilator.

Also presented are discussions of the microcirculatory anatomy in muscle, methods of measuring blood flow in muscle, the influence of changes in the "transmural pressure" of Burton and

Yamada, and the effects of sympathectomy and of exercise on blood flow in skeletal muscle.

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SUCCESS IS THE KEYNOTE

of our Philadelphia — 1958 meeting! An interesting scientific exhibit will contribute much to our success. In addition to the tremendous value of these exhibits, YOU have the opportunity to be considered for one of the coveted awards. Requests for applications for scientific exhibit space in connection with the 36th annual session scheduled for August 24-29, 1958, Hotel Bellevue-Stratford, Philadelphia, are now being received. Official blanks will be mailed after January 1, 1958. Address all communications to the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, Illinois.

Electromyography in Disc Disease

Francis J. Bonner, M.D.
and
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The electromyograph is an instrument used to measure the electrical voltages present in normal and abnormal muscles during voluntary action, reflex action, and at rest. The use of this instrument in physiological research has long been accepted. With Jasper's[1] development of the monopolar needle electrode and the subsequent work of Golseth, Marinacci, and others, the electromyograph has become a clinical instrument.

The apparatus consists of a needle, which is insulated except at the tip, a ground plate, and a conduction cable leading from an amplifying system into a loud speaker and then to an oscilloscope tube. The record is made by means of a camera. If desired, electromagnetic tape may be attached for a running record. The instrument and the patient to be examined are enclosed in a copper-screened room devised to obtain complete electrical silence. Most of these patients receive no medication before examination.

As early as 1791 Luigi Galvani[2] described electrical voltages as being associated with contraction of muscle. Schiff[3] observed fibrillation in denervated muscle of a dog's tongue five days after the hypoglossal nerve had been cut. Many of the phenomena recorded by the electromyograph have been known for a long time but had to await the development of the oscilloscope and present-day technical apparatus to measure and record them accurately.

Types of Abnormal Action Potentials

Nerve root injury resulting from compression by a herniated disc will produce muscle denervation in the particular muscles supplied by that root. The electromyograph records three types of abnormal action potentials in these partially denervated muscles: fibrillation, fasciculation, and polyphasic waves.

Fibrillation. — Approximately 14 to 21 days following the compression of the nerve root, the denervated muscle fibers begin to fibrillate. Fibrillation is observed only on direct visualization of the muscle itself and sometimes in the tongue. It cannot be seen through the skin. The action of fibrillation is spontaneous and cannot be controlled by the patient; therefore, it is a purely objective phenomenon. The voltages associated with fibrillation appear as monophasic and diphasic spikes, 1 to 2 milliseconds in duration, and from 5 to 100 microvolts in amplitude. They repeat with a rhythm and often sound like the dropping of rain on a tin roof. Sometimes seen associated with fibrillation is a positive sharp wave which resembles an uncrossed T. It occurs with regular rhythm.

Fasciculation. — Fasciculation voltages are not found in the majority of root lesions. Shea, Woods, and Werden[4] found them in less than 50 per cent of their cases. They may be seen through the skin, but, when not so visualized, their presence can be detected with the electromyograph. They produce wave forms characterized by large complex action potential occurring in an irregular manner and a distant, thumping sound on the audioscope.

Complex Motor Units or Polyphasic Waves. — Polyphasic waves are widespread action potentials which give a chugging sound on the speaker. These voltages are associated with nerve degeneration and with nerve regeneration. They are seen on action.

Method

The method of localization of root compression as described by Shea, Golseth, and Marinacci[4, 5] was followed. Let us assume that the first sacral nerve root is compressed by a herniated disc between the fifth lumbar and first sacral

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vertebrae. The needle electrode is inserted into the quadriceps femoris supplied by the second, third, and fourth lumbar nerve roots, and no evidence of denervation is found. The anterior tibial muscle supplied by the fourth and fifth lumbar nerves is examined and again no denervation voltages are found. As the examination progresses, the extensor hallucis longus, the extensor digitorum longus, and the peroneus longus are entered. The latter is supplied by the fifth lumbar and first sacral nerves and reveals a considerable amount of fibrillation voltages. The same is true in the gluteus maximus and hamstrings. Similarly, in the lateral and medial heads of the gastrocnemius the electromyograph reveals evidence of denervation. In this instance all of the muscles supplied by the first sacral nerve root reveal evidence of fibrillation. To localize more closely, the back is examined, and denervation is found in the erector spinae muscles opposite the first sacral nerve roots.

In an effort to determine the accuracy of electromyography, we decided to examine 30 patients who had had electromyography and surgical exploration. Thirty cases were selected by the record room clerk, whose only criteria were that the patient had had electromyographic studies and surgery. In 24 out of 30 of these patients, pathologic change in the disc was found at the exact level detected by the electromyograph. This represents an accuracy of 80 per cent for electromyographic findings. Of the remaining six cases, the electromyographic report was not completely accurate in four but was of definite clinical value. There were two cases in which the electromyograph did not describe the location.

Report of a Case

A woman who had a myelogram showed a defect at the fourth lumbar vertebra. The electromyographic findings revealed a lesion involving the fourth and fifth lumbar and first sacral nerve roots. The operation revealed a completely extruded disc fragment lying beneath the first sacral nerve root, at the fifth interspace. The extradural space posterior to the body of the fifth lumbar vertebra contained a massive piece of disc material 1.5 by 5 cm. which had migrated up to the body of the fourth lumbar vertebra. The postoperative diagnosis was a completely extruded disc at the fifth lumbar vertebra with cauda equina compression.

Discussion

It has been noted by Shea[4] that a medially extruded disc between the fourth and fifth lumbar vertebrae may extrude upon the first sacral nerve root. This would lead one to think that a disc existed between the fifth lumbar and first sacral vertebrae, whereas the lesion is a medially extruded disc between the fourth and fifth lumbar vertebrae. A single root lesion, therefore, involving a first sacral nerve root can mean a disc between the fifth lumbar and first sacral or a medially placed disc between the fourth and fifth lumbar vertebrae. Two of the partially correct cases were reported as having a lesion at fourth lumbar vertebra, but the lesions were exactly at the fifth. There is no explanation for this.

One of the cases in which no pathologic change was found in the lumbar area showed a defect on the myelogram at the fourth lumbar and another at the eleventh thoracic vertebrae. The electromyograph showed bilateral involvement of the fifth lumbar and first sacral nerve roots. Surgery revealed a hemangioma of the spinal cord at the eleventh thoracic vertebra. The other case showed nerve root involvement, surgery revealed no defect. None of these patients were evaluated clinically by the electromyographer. The clinical picture must be correlated with the electromyographic findings.

Advantages of the electromyograph in herniated disc evaluation may be listed as follows:

1. It does not require hospitalization.
2. It has no complications.
3. It is accurate when correlated with the clinical picture and other studies.
4. It is of value in distinguishing between local root pressure and general neuropathy.
5. It may be positive when the myelogram is negative.

6. It is a quantitative measure of nerve damage.
7. It helps to exclude the malingerer.
8. It takes at least 14 days for electromyographic changes to be present; therefore, electromyographic studies made immediately after the accident differentiate between a pre-existing condition and a new condition. A pre-existing disc will show evidence of denervation immediately following the accident, whereas a new disability will not be evident on the electromyograph for at least two weeks.

Summary

A brief description of localization and measurement of nerve root compression by the electromyograph has been presented. Thirty cases were selected at random from many which had electromyography and spinal surgery. In 24 of these cases the electromyograph described the exact and total localization of the pathologic condition. The advantages of electromyography in suspected surgical root involvement and the accuracy of this examination when correlated with the clinical picture have been demonstrated.

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IMPORTANT ANNOUNCEMENT

The Editorial Board of the *ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION* has established a special subscription rate of $5.00 per year to be granted to bonafide residents in physical medicine and other specialties in the United States, its territorial possessions, Mexico, Canada, United Kingdom and Europe. The following rules apply:

1. The subscription may be entered for a period not to exceed three years.
2. All orders for this special rate must be accompanied by a letter of verification from the director of the training program confirming the resident's status and the number of years remaining in the resident's training program.
3. This special rate is not applicable if less than one year of training remains to be completed in the applicant's residency program.
4. The subscription is not transferable and must be entered in the resident's name. It cannot be sent to a hospital, organization, institution, or a person other than the subscriber.

Those desiring to avail themselves of the special rate to residents should write to Archives of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2.

Communication Problems in Medicine

Herold Lillywhite, Ph.D.
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Physicians and other specialists working directly with patients soon come to the realization that more failures result from a breakdown in person-to-person relationships than from lack of professional competence. Since person-to-person relationships are carried on largely by the spoken word, it is with this avenue of communication that we must deal if we are to solve the problems of breakdown. Apparently most of us assume that because we can talk we make ourselves adequately understood in most situations, and because we can hear we understand completely what we hear when another person talks. For these reasons little or no time in our training is devoted to developing the communication skills necessary for adequate interpersonal understanding. Often we do not even develop an awareness of the possibilities and situations in which miscommunication is most likely to occur.

In the routine of daily living, misinterpretations due to faulty communication are not too serious in most cases. In matters where an individual's physical or mental health and sometimes even his life is at stake, it becomes extremely important that people understand each other. In the field of medicine, possibilities of misunderstanding are multiplied manyfold by the nature of the vocabularies that must be used, the kind of information that must be divulged, and, in many instances, the stress under which the individuals try to communicate.

Examples of Miscommunication

These misunderstandings take many and varied forms. Such a one almost ended in disaster when a physician told an Indian mother to "steam" her child as part of the treatment for respiratory infection. To the Indian mother "steaming" meant the hot rocks and boiling water of a rigorous ceremony known to her tribe. To the physician it meant something entirely different. In another situation, a physician turned to a mother with the statement, "With the right kind of treatment at home this boy will be all right." The mother's response, "He gets the right kind of treatment at home," was a natural one, but the doctor angrily informed her that this was not so. Neither individual realized that "right kind of treatment" meant something different to each one. The orthopedist who turned to an intern, after examining a child, with the remark, "We're going to have to shorten this leg by surgery," had no notion of the effect of his words on the mother who was listening in. She said nothing, but refused thereafter to return to the clinic. When asked why, she replied, "They're not going to get this child back in that place and cut his leg off to shorten it."

After working together for approximately two years, a team of about twenty specialists in a cerebral palsy clinic discovered by chance that there were several different meanings among the group of the term "brain damage." This was probably the most commonly used term in the diagnostic clinic; yet, there had been at least three, and probably more, different interpretations of the term every time it was used.

There is one common factor in all of these examples of miscommunication; that is, none of the persons involved were aware of the miscommunication at the time it was happening. These are not unusual occurrences in a medical situation. The people involved are not stupid or careless people. They are conscientious, highly skilled persons, and all of them were doing their very best to get the best kind of treatment for the patient as they saw it. Yet these misunderstandings occur many times daily and the consequences sometimes reach serious proportions. We see tensions, disagreements, open conflict, isolation, inferior service to the patient, and sometimes tragedy resulting from the inability of

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specialists to communicate adequately among themselves or with patients and their relatives.

Team Approach as a Solution to Miscommunication

Because of the problems caused by poor communication in many situations dealing with diagnosis and treatment of the ill and crippled, many attempts have been made to provide more effective interpersonal relationships and communication among the specialists involved. One of the most widely accepted methods is the development of the rehabilitation "team." There are many different concepts of what constitutes a rehabilitation team, and different groups have met with widely varying success. While it is true that the team concept is basically a sound attempt to improve communication among specialists and their patients and relatives, there appears to have been some kind of unreasoned reliance on the term "team." It often seems to be assumed that just because a rehabilitation team comes into being the efforts of all individuals involved will be well coordinated and well integrated, and that communication among them is assured. This is far from the truth, but the reasons for failure lie, not in a faulty concept of integration, but in many different kinds of difficulties involving attitudes, personal attributes, and situational limitations. It would seem well for those of us engaged in medical rehabilitation to examine some of the specific causes of miscommunication among us in order to begin to develop more efficient methods of communication.

Three different kinds of medical rehabilitation teams at the University of Oregon Medical School, Crippled Children's Division, provide some experiences that may be worth examining. The three major programs have to do with congenital heart, cerebral palsy, and cleft lip and palate. These programs are carried out by the staff of the Crippled Children's Division and a large number of participating specialists from the medical school, the dental school, private practice, and public agencies. The total number of specialists who are actively participating in the clinics and the staffings in these three programs reaches well over 150. Each program is coordinated by a different person — the heart program by a heart specialist, the cerebral palsy program by a pediatrician, and the cleft palate program by a speech pathologist. The concept of a well-integrated team in each program has been kept uppermost in the development to date. Human relations and communication problems involved have sometimes been serious, have always been most interesting, and their solution has been an exciting challenge. Many of the problems have yet to be solved, but it is possible at this stage to identify some of these problems specifically and to point to methods of solution.

Causes of Miscommunication within Team

A rather long list of specific barriers to adequate integration and communication can be made from these various clinics. These are as follows:

1. Specialists sometimes show irritation at the interrupting of established patterns and schedules of individual diagnosis and treatment which often are quite radically altered by many other specialists entering the picture.

2. Some specialists are suspicious of others and of their methods and tend to be defensive of their own particular areas and methods.

3. Specialists, being accustomed to working on a strict time schedule, find it difficult to take sufficient time to sit down with other specialists and discuss problems fully and arrive at carefully considered decisions.

4. Professional class distinction plays a distinct part in preventing free interchange of information, informality, and friendliness in clinics. A specialist sometimes seems to consider his work or his abilities so different from that of other specialists that there is almost complete lack of verbal intercourse at an understanding level. Medical and dental specialists often find it difficult to accept and understand the functions of those in the associated specialties. There sometimes is a tendency, on the part of medical specialists, not to take seriously the contributions of the nonmedical participants in the program. These professional

class distinctions seem to be based on the nature of the training, misinformation, lack of information, insecurities in individuals themselves, and professional phobias and rigidities.

5. At clinic staffings, examining doctors often give mental diagnoses, speech diagnoses, and social history even though psychologists, speech pathologists, and social consultants are waiting to report their findings.

6. Medical specialists often tend to cluster together at clinic staffings and to talk to each other, leaving the rest of the group out of the discussion.

7. At clinic staffings there sometimes is a tendency to substitute opinion for the reporting of observed facts.

8. Nonmedical specialists often have a faulty concept of medical specialists, tending to be both fearful of presenting their own findings and suspicious of the physician's motives and attitudes toward them.

9. Inadequate leadership of staffing sessions sometimes hampers integration and adequate discussion.

10. Final dispositions and recommendations concerning cases often are not clear to the entire group.

11. At clinics there sometimes is a tendency to talk in overtechnical language, apparently to impress other specialists rather than to communicate.

12. An inarticulateness in social discourse is apparent on the part of some; others tend to over-verbalize.

13. A noticeable inability to talk with parents and be understood is sometimes present. This seems partly to be the result of an attitude that there is no reason for parents to know what is going on, but it also is a result of an unawareness of where and how misinterpretations may occur and an insensitivity to the individual parent's limitations.

14. An obvious inability to listen is noticeable in many of the specialists. Apparently, because they are accustomed to making evaluations, arriving at decisions quickly, giving advice and directions, and ending the matter there, they listen inaccurately, and sometimes impatiently, to other specialists and to parents.

15. Many of these highly specialized persons have a very poor concept of people as individuals and a relative insensitivity to social situations and relationships.

16. An almost complete lack of understanding of the nature, functions, and dangers of language is often found. Terminology that could be understood by those in other specialties, or by laymen, is difficult. There is considerable unawareness of the constant possibility of misunderstanding and of the fact that misinterpretations often are taking place.

Advantages of Team Approach

To balance this long list of liabilities are several very specific and valuable assets that account for much of the success of many medical rehabilitation teams and that will do much toward overcoming many of the liabilities just listed. Among these assets are:

1. Almost without exception, the specialists involved in any phase of the treatment of children in the clinics under discussion are found to have a sincere interest in the welfare of the patients. They are attempting to do their best for the children and will put this goal above all others.

2. These highly trained, individualistic, specialized persons are generally found to possess a flexibility that enables them to change direction when it is shown that a change would be to the advantage of the patient.

3. Most specialists are willing to accept help from other specialists in different areas when the competency of the other specialist is demonstrated, and when it is found that there is no threat from the other specialist.

4. There is an eager and inquiring attitude with respect to the possibility of finding something better in the way of diagnosis and treatment.

5. By the very nature of their work, specialists dealing with handicapped and disturbed individuals develop a wide range of tolerance and understanding of individual differences and opinions. This helps immensely in the process of integration.

Suggestions to Improve Team Approach

With these important assets, several specific steps can be listed that individual specialists and groups engaged in coordinated efforts at rehabilitation can take to make communication more adequate and treatment more effective:

1. It must be recognized from the beginning that time is an important factor in the development of adequate integration in a rehabilitation team. There is no more possibility of hurrying the development of the team than there is in pushing the crippled child beyond his normal pattern of development.

2. Procedures and patterns of operation of the group should be developed by the group, insofar as possible, rather than imposed from outside. The framework should be kept flexible to allow for necessary changes.

3. Individuals participating in the rehabilitation program need to develop a mutual respect for each other as individuals. The contribution of each member of the team must be considered as important as that of any other member.

4. The central purpose of all the efforts of the entire rehabilitation group —adequate care for the patient—should be kept uppermost at all times. In many cases this means subordinating individual desires to the recommendations of the group.

5. A rehabilitation group should take time to examine its procedures and study its weaknesses. Individuals and the group might do well to attack directly some of the communication problems involved and institute a study of communication principles and procedures as well as group dynamics.

6. Such groups need firm leadership, but not a dictator. The leader might represent any of the specialties involved as long as he has the personal qualifications necessary for bringing about the integration desired.

7. Informal study sessions, aside from clinics, have been found very useful for better function of rehabilitation groups. At these sessions, materials having to do with various problems, films, and discussions can be arranged.

8. The actual carrying out of examination, diagnostic, and treatment procedures involves a great deal of interpersonal communication. There is less chance of misunderstanding and misinterpretation in face-to-face situations and by telephone than in written reports, memos, notes, formal requests, written instructions, and so forth. So much misunderstanding can come from a written report or memo that these should be relied on only when absolutely necessary.

9. Attention should be paid to pleasantness and convenience in the examining rooms, in the group meeting room, and to providing a friendly, informal, relaxed atmosphere. In staffing, seating arrangements that provide for a mixing of the specialists have been found helpful.

10. Medical specialists probably will have to make the first move toward breaking down the barriers between medical and nonmedical specialists. The doctor occupies the position of final authority in so many persons' minds that nonmedical specialists, in many cases, will stifle information and opinion rather than run the risk of overstepping this "authority."

11. Nonmedical specialists need to revise attitudes toward the medical profession and to make every effort to correct false notions that set up barriers to adequate communication.

The foregoing suggestions will not apply to all situations, but most of them will probably apply to many situations. It is likely that the impetus behind the movement toward rehabilitation teams has come from the fractionating effect of the very high degree of specialization that has taken place in all areas of rehabilitation in recent years. Adequate integration and communication among the highly specialized persons working with the crippled and the ill seems to be the only method known to preserve the necessary specialization and still keep the focus on the whole individual and the total rehabilitation plan. Many of us may not like this "interference," but it might be argued that this is a compromise, with the alternative of going back to the time when most rehabilitation was "general practice" and the specialist was a rarity. We now have suf-

ficient experience to know that this compromise is adequate and workable where individuals involved have the will to make it so; but the will to make it so is not quite enough. Once we have the will, we must also develop the skills, and it is true that most of us lack these skills until we gain the understandings and the experience to develop them. The suggestions in this paper are presented as a possible aid in gaining the necessary understandings.

Balanced Foot-Weight for Quadriceps Exercises

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A new balanced foot-weight that does not strain the lower leg has been developed for quadriceps exercises in the physical medicine department of the Conemaugh Valley Memorial Hospital, Johnstown, Pennsylvania.

The conventional quadriceps boot holds the weights so far distal to the ankle joint that when the knee is extended in the sitting position an excessive strain is placed upon the anterior tibial muscle. This accentuates any previous tendency to foot-drop. When the conventional "foot-drop" quadriceps boot is used, its calf-bearing plate obstructs circulation so severely as to prevent use of the optimum strength of the quadriceps.

The new balanced foot-weight was made of scrap-iron and was welded in the hospital maintenance shop. It is shown in figures 1 and 2. Its construction localizes the standard bar-bell weights in line with the transverse axis of the ankle joint. Therefore, no strain is placed upon the lower leg muscles while the quadriceps are being exercised resistively. All skin pressure is upon the instep of the foot; hence it does not interfere with any major circulation. This foot-weight also permits fine gradations of stress to be placed upon either the foot invertors or evertors by merely using a different amount or position of the weights at the medial and lateral aspects of the foot.

The use of this balanced foot-weight has permitted more rapid increases in resistance during heavy-resistance quadriceps exercises, with resultant faster increase in strength and range of motion of knee extension.

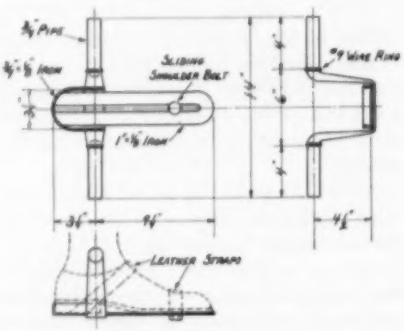


Fig. 1 — Construction of balanced foot-weight.

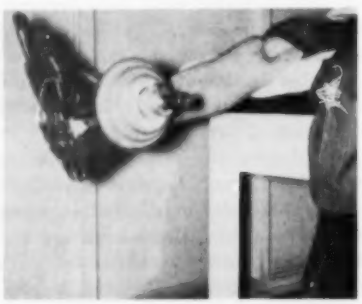
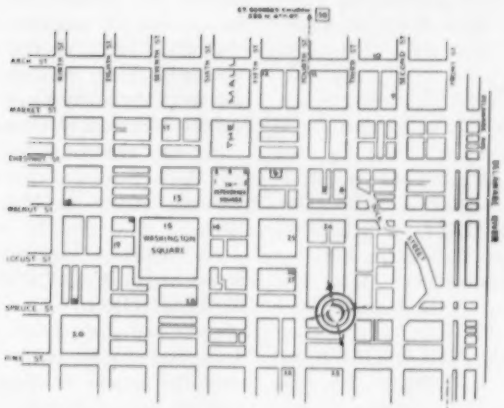


Fig. 2 — Balanced foot-weight in use.

"Let Brotherly Love Continue" . . .

portrait of philadelphia. III



Map of Old Philadelphia

Historic Philadelphia
The Cradle of Liberty

Historic Philadelphia is every American's heritage. It was here in Independence Hall that the Declaration of Independence and the United States Constitution were penned signalling the birth of a new nation . . . it is here that the famous Liberty Bell, symbol of freedom throughout the world, is housed . . . where the First Continental Congress met . . . and it was here that the first American Flag was made and adopted by Congress.

It is truly the Cradle of Liberty. William Penn, its founder, called it his Greene Countrie Towne — the City of Brotherly Love — names that have become familiar to people in all parts of the civilized world.

While today it is the third largest city in the United States and one of the greatest industrial centers of the world, Philadelphia still maintains its warmth, and the visitor immediately upon setting foot in the great sprawling city of skyscrapers, parks and rivers is aware of its delightful atmosphere of friendliness. Its citizens like visitors. It's their Colonial heritage.

There are enough historic sites of national importance located within center city to keep the visitor on the go for several days. And this wouldn't include a trip to Valley Forge Park, about eighteen miles from the downtown area.

In order to help the visitors enjoy some of the more important historic points during his limited stay here, a leisurely walking tour of the Independence Square area has been worked out.

The visitor can be his own guide by using the map of old Philadelphia on which each place of interest has been marked with a number corresponding to the following outline.

1. First on the list is INDEPENDENCE SQUARE, located between 5th and 6th Streets, Chestnut to Walnut, which in Colonial times was popularly known as State House Yard. The City Fathers specified in their Deed of 1769 that this Square was "to remain a publick greene and walke forever." Situated in the Square we find the historic State House Row, the buildings of which are enumerated as 2, 3 and 4.

2. INDEPENDENCE HALL was originally the State House of Pennsylvania in 1732. Here may be viewed the Liberty Bell and the Declaration Chamber where the Continental Congress adopted the Declaration of Independence, July 4, 1776. In 1787 the Federal Constitutional Convention framed the Constitution of the United States in Independence Hall. Open daily 9 a.m. to 4 p.m. (free).

3. CONGRESS HALL is directly adjacent, on the west side of Independence Hall. It was originally built for the County Hall in 1789, but was occupied by Federal Congress from 1790 to 1800.

4. OLD CITY HALL built in 1789 for use as the City Hall is the building to the east of Independence Hall. The first Supreme Court of the United States convened here 1791-1800.

5. AMERICAN PHILOSOPHICAL SOCIETY built in 1789 is the only private building in Independence Square and is located directly in back of the Old City Hall. This Society was the outgrowth of "The Junto" originated by Benjamin Franklin in 1727.

6. On the south side of Chestnut Street east of 5th Street is an old columned building which for many years was the U. S. CUSTOM HOUSE. Built in 1819, it was originally the home of the Second United States Bank.

7. Travelling further east on Chestnut Street we come to CARPENTERS' HALL at 320 Chestnut St., built in 1770. This hall was originally built for the occupancy of the Carpenters' Company, a guild of master carpenters. Here in 1774 the First Continental Congress met.

8. A short walk to the south on 3rd Street brings one to 3rd and Dock Streets, where stands the oldest banking building in America, erected in 1795 by the FIRST BANK OF THE UNITED STATES. It was later owned and occupied by Stephen Girard from 1812 to 1831.

9. Return to Chestnut Street and continue east to 2nd Street, then walk north, crossing Market Street. On the west side is CHRIST CHURCH built in 1727. The original congregation was founded in 1695. To name but a few of the historic personages who attended Christ Church we list George and Martha Washington, John Adams, Benjamin Franklin, Robert Morris and Lafayette. Robert Morris is buried in the Church Yard.

10. The home of BETSY ROSS is located just around the corner at 239 Arch Street. It was here that Betsy Ross is credited with having made the first American Flag, having been commissioned to do so by George Washington, Robert Morris and George Ross.

11. On the southeast corner of 4th and Arch Streets is the oldest Friends' Meeting House in Philadelphia (built 1804).

12. Walking further west on Arch Street to 5th is the CHRIST CHURCH BURIAL GROUND, which has been in existence since 1730. Here from the Arch Street side at 5th Street may be seen the graves of Benjamin Franklin and his wife, Deborah.

13. Resume your walk to 6th Street and turn south, to 6th and Walnut Streets. On the northwest corner stands the CURTIS PUBLISHING COMPANY, home of the *Saturday Evening Post*. The land on which this building stands was originally owned by James Logan, Secretary of William Penn, where he established the Loganian Library in 1745.

14. On the southeast corner of 6th and Walnut Streets is the home office of the PENN MUTUAL LIFE INSURANCE COMPANY, which occupies the site of the Old Walnut Street Prison (1775-1838). The prison extended from Walnut Street to Locust Street. Segregated from the criminals, the debtors were imprisoned in a separate compartment at the Locust Street end, where now stands the publishing house of J. B. LIPPINCOTT COMPANY at 227 S. 6th Street. THE ATHENAEUM OF PHILADELPHIA, located at 219 S. 6th Street, is also on the old prison site. There are two outstanding items of interest connected with this prison. Our great patriot, Robert Morris, "Financier of the American Revolution" and signer of the Declaration of Independence, was imprisoned here as a debtor from 1798 to 1801, and here was visited by Presi-

dent Washington, who took dinner with him. Earlier in the prison's history, 1793, the first air voyage in America was made from the prison yard by Jean Pierre Blanchard.

15. Directly across the street and diagonal to Independence Square is WASHINGTON SQUARE, which takes in the area from 6th to 7th and from Walnut to Locust Streets. In 1704 this Square was designated as a Potter's Field and later hundreds of soldiers of the Revolutionary War and many victims of the great yellow fever epidemic of 1793 were buried here.

16. To the west of the Square at the southwest corner of 7th and Walnut Streets is the PHILADELPHIA SAVINGS FUND SOCIETY, the oldest savings bank in America, established in 1816.

17. At 15 S. 7th Street, between Market and Chestnut Streets is the ATWATER KENT MUSEUM OF PHILADELPHIA HISTORY. It occupies the former building of the Franklin Institute and contains a splendid museum of Philadelphia history.

18. Coming back to Walnut Street, further west at 9th Street, may be seen the oldest theatre now standing in the United States, the WALNUT STREET THEATRE, built in 1808.

19. Retracing your steps back to 8th Street and turning south to No. 225 is the old MORRIS MANSION, which was built in 1787. Here still live descendants of the Morris family.

20. Walking still further south on 8th Street to Spruce Street one comes to the PENNSYLVANIA HOSPITAL, which was founded in 1751 through the efforts of Benjamin Franklin and Dr. Thomas Bond. This was the first hospital in the United States and was built "well out in the woods."

21. Across from the hospital on Spruce Street between 8th and 9th Streets, almost hidden by red brick walls, is the burial ground of the Congregation MIKVE ISRAEL, the land for which was granted to Nathan Levy in 1738 by John Penn. It is the burial place of Rebecca in his book "Ivanhoe."

22. On Pine Street at 4th is the OLD PINE STREET PRESBYTERIAN CHURCH, built in 1768, which is the only Presbyterian Church preserved from the Colonial period.

23. ST. PETER'S PROTESTANT EPISCOPAL CHURCH, is located at 3rd and Pine Streets. Founded in 1761, it was governed by the vestry of Christ Church. Here George Washington had a pew.

24. Returning to Walnut Street and walking east again, half way between 4th and 3rd Streets on the south side, is the entrance to OLD ST. JOSEPH'S CHURCH, now completely hidden by the growth of a city, tucked away in Willings Alley. This is the oldest Roman Catholic Parish in Philadelphia. The original church was built in 1733, but it has since been rebuilt and enlarged several times.

25. The PHILADELPHIA CONTRIBUTIONSHIP FOR THE INSURING OF HOUSES FROM LOSS BY FIRE is located at 212 S. 4th Street. Organized in 1752, it is the oldest Fire Insurance Company in America. Its fire mark is the hand-in-hand.

26. A few doors further south on 4th Street at No. 240 is the MUTUAL ASSURANCE COMPANY for insuring houses from loss by fire, which was founded in 1784. Its fire mark is the green tree.

27. As a side excursion, we list two other old Roman Catholic Churches of historical fame. As the congregation of Old St. Joseph's grew it was found necessary to purchase land nearby for a church and burial ground, and in 1763, ST. MARY'S CHURCH was consecrated, at 244 S. 4th Street, where the original church still stands. For some years St. Mary's was attended by the same clergy as administered to St. Joseph's. In the graveyard located to the rear of the church may be found the tomb of Commodore John Barry and other famed personages of that day.

28. HOLY TRINITY CHURCH, founded 1789, located at 6th and Spruce Streets, was also an outgrowth of this parish and was originally attended mostly by the German and French Catholic population of the neighborhood. Here

the body of Stephen Girard was originally interred before its removal to Girard College.

29. Although the map does not extend far enough to include OLD SWEDE'S CHURCH, GLORIA DEI, it is well worth your time to discover for yourself the oldest church in Philadelphia, built in 1700. It is located at Swanson Street near Front and Christian Streets. Christian Street is nine blocks south of Market Street.

30. Another historic point of interest in this old neighborhood not included in the map is ST. GEORGE'S METHODIST CHURCH, located at 235 N. 4th Street. This is the oldest Methodist Church in Philadelphia.

we meet . . .

in philadelphia . . .

in 1958 . . .

36th Annual Session, American Congress of Physical Medicine and Rehabilitation, Philadelphia, Hotel Bellevue-Stratford, August 24-29, 1958.

WE WANT TO KNOW ABOUT YOU—

your activities, local and national, are of interest to us. *Remember, what may not be news to you is news to others.* Please send all information before the 15th of the month. The news blank is for your convenience — **send it today!**

— MEMBERSHIP NEWS —

Archives of Physical Medicine and Rehabilitation

W h o ?

W h a t ?

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book reviews

The reviews here published have been prepared by competent authorities and do not necessarily represent the opinions of the American Congress of Physical Medicine and Rehabilitation and/or the American Academy of Physical Medicine and Rehabilitation.

TEXTBOOK OF ORTHOPAEDIC MEDICINE. Vol. II. Treatment by Manipulation and Massage. By *James Cyriax*, M.D. Fifth edition. Cloth. Price, $6.50. Pp. 373, with illustrations. Paul B. Hoeber, Inc., 49 E. 33rd St., New York 16, 1957.

Dr. Cyriax considers this as a fifth edition with certain changes. He had published previously a book entitled "Deep Massage and Manipulation Illustrated" and in 1947 a book entitled "Rheumatism and Soft Tissue Injuries." In order to avoid unnecessary repetition, he is publishing a textbook of orthopaedic medicine in two volumes. Volume I is "Rheumatism and Soft Tissue Injuries" while Volume II is the book reviewed. This book is written primarily for physical therapists, although technics are for all interested. He describes in detail the principles and technic of manipulations and massage giving theories for its use and its proper administration. He describes the various forms of exercise which can be used and are of value in treatment. He describes the treatment of injuries to bones, muscles and tendons, and to ligaments and capsules of joints. With the use of illustrations, using 112 plates, he describes in quite definite detail his method of massaging, manipulating and exercising each part. In this section he shows his method of treating the muscles of the shoulder and back, of the hip and of the various joints — shoulder, elbow, spine, hip, knees, ankles, foot, etc. It is detailed and explicit and should be of interest to physical therapists and to those interested in using massage and movement in the treatment of the motor system. *(Frances Baker, M.D.)*

DISCUSSIONS ON CHILD DEVELOPMENT, VOL. I. The First Meeting of the World Health Organization Study Group on the Psychobiological Development of Child, Geneva, 1953. Edited by *J. M. Tanner*, M.D., and *Barbel Inhelder*. Cloth. Price, $10.00 per set. Pp. 240, with illustrations.

DISCUSSIONS ON CHILD DEVELOPMENT, VOL. II. The Second Meeting, London, 1954. Edited by *J. M. Tanner*, M.D., and *Barbel Inhelder*. Cloth. Pp. 271, with illustrations. International Universities Press, Inc., 227 W. 13th St., New York 11, 1957.

The World Health Organization undertook a research on the psychobiological development of the child. In 1953 the first meeting of the study group particularly devoted to this subject took place in Geneva. This group was composed of distinguished scientists from numerous countries. The meeting lasted one week and the first volume is a verbal transcript of the proceedings. The subjects considered were physical and physiological aspects of child development, the behavior of new-born anencephalics with various degrees of anencephaly; criteria of the stages of mental development, comparative behaviorology, and other related structures.

The second volume is a collection of the discussions which took place at the second meeting in London in 1954. Grey Walter discussed the psychobiological development of living creatures which can occur in six ways — that is, by genetic evolution, reflexive action, instinct, practice, learning by association and social communication. The first three are concerned with mechanisms which are to a great extent innate, whereas the last three categories are concerned mainly with acquisition by experience. Grey Walter further analyzed the conditioned reflex by application of electrophysiological methods demonstrating its development and action through the use of ingenious electric models.

Bindra discussed the experiments on dogs that were conducted at the McGill Psychological Laboratory. This series of experiments was concerned with the role of early learning or early experience in emotional and problem-solving behavior as postulated by Hebb. He also reported on the experiments which dealt with the effects of sensory or perceptual deprivation in the human adult. A considerable amount of recent neurophysiological evidence has shown that in order for the brain to function normally it must be constantly bombarded by sensory stimulations. Sensory stimulations appear to have two separate types of function, that is, they evoke specific response (perception), and secondly cause a general effect of arousal. The results of these experiments suggested that the normal working of the brain depended on this type of sensory stimulation.

Another research program concerned individual differences in reaction to stress and the development of anxiety. Various investigators have tried to define anxiety in a number of ways, some in terms of Rorschach indices, others by psychometric scales; others have taken ratings and the opinions of a number of clinical psychologists. It was found that after exposing subjects to stress it is hard to select in advance the high and low anxiety subjects by these tests. The Rorschach indices and psychometric scales were negative, showing no differential effect of stress on subjects who had been differentiated on this basis. Clinically it is found that anxiety does have something to do with performance under stress. Whatever variable determines the responses of subjects to stress is probably related in some way to anxiety, though it is not anxiety as determined by the Rorschach indices. One of the theoretical aims of this research was to analyze anxiety and to replace it by more precise dimensions. In general, it was found that low responsive subjects actually improved their performance under mild stress. The high responsive subjects deteriorate and the medium responsive subjects do various things.

Liddell discussed his experiments and findings related to psychic trauma and the functional significance of emotion. Whiting presented his views on learning theory. Bowlby presented a film to show how a child responds in a separation situation. This caused certain psychological stress reactions which tended to persist for a considerable time. The last presentation was a film of Lorenz's on behavior patterns of prematures, newborns and infants up to about one year of age.

Both volumes of the "Discussions on Child Development" are extremely interesting and present the latest research developments and ideas not only on children but also on the adult. Some of the findings, as recorded, would explain certain well-known phenomena which occur in neuromuscular re-education and rehabilitation of patients in general. *(Odon F. von Werssowetz, M.D.)*

PRINCIPLES & TECHNICS OF REHABILITATION NURSING. By *Florence Jones Terry*, R.N.; *Gladys S. Benz*, R.N.; *Dorothy Mereness*, R.N., and *Frank R. Kleffner*, Ph.D. Cloth. Price, $5.50. Pp. 345, with illustrations. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1957.

This book is well written, but is a little too comprehensive. The first two units make an excellent handbook to be used by all nurses. In this the authors give an overall philosophy, which is very helpful. The chapter titled "Personnel — Members of the Rehabilitation Team" is especially good.

The other units on rehabilitation in special diseases, aged, children, mentally ill and speech therapy are repetitious and give a detailed treatise on each category. However, they do present some excellent case histories.

In a teaching situation for undergraduate nurses, the entire book will probably be valuable, but for graduate nurses and other workers in the rehabilitation field, the first two units are sufficient. This book would also be helpful to other hospital personnel working on a rehabilitation team. *(Florence Mahoney, M.D.)*

THE DOCTOR, HIS PATIENT AND THE ILLNESS. By *Michael Balint*, M.D. Cloth. Price, $7.50. Pp. 355. International Universities Press, 227 W. 13th St., New York 11, 1957.

Dr. Balint has contributed the greatest armamentarium to the practice of medicine through his clear and concise presentation. The indoctrination of the general practitioner with heart-to-heart discussions through a weekly seminar is not only enlightening but also very instructive. In fact, every practicing physician whether he is a specialist or general practitioner could benefit by such instructions.

Great stress is placed upon the total patient who is not a machine but the sum total of physical, emotional, psychological and mental factors. The book further emphasizes the physician's own personality, manners and understanding which enter into the successful patient-doctor relationship.

In brief, the book is really the ten commandments for the successful practice of medicine. "Thou shall listen" is one of the commandments which is very timely. The case histories add much to the cohesion of the book. The door to successful office manners and practice of medicine has finally been opened. *(F. F. Schwartz, M.D.)*

THE RIDDLE OF STUTTERING. By *C. S. Bluemel*, M.D. Cloth. Price, $3.50. Pp. 142. Interstate Publishing Inc., Danville, Ill., 1957.

An approach to the understanding and therapy of the stutterer is made from the psychiatric viewpoint. The person thus handicapped is diagnosed as a disorganized personality, with his speech problem the end result of initial frustration.

A system of therapy is described in which the patient is oriented as to the mechanism of his disability, and is aided in first organizing his non-verbal, then his verbal speech.

While the concept of treating the emotional difficulties of the stutterer is not new, Dr. Bluemel is to be commended for placing particular emphasis on attacking the basis of the problem, while offering a practical approach to treatment of symptoms.

The section on therapy could be expanded to good advantage for the benefit of therapists who wish to use this method. Records for use in therapy, prepared by the author, are available. *(Harriet E. Gillette, M.D.)*

THE YOUNG HANDICAPPED CHILD. Educational Guidance for the Young Blind, Cerebral Palsied and Deaf Child. By *Agatha H. Bowley*, Ph.D. Cloth. Price, $3.50. Pp. 128, with illustrations. The Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore 2, 1957.

All those who deal with handicapped children would be more informed for having read this brief work. While there are no significant technical contributions, the depth of understanding of special problems of handicapping conditions is transmitted to the reader in language which gives a clearer picture of developmental problems. The author is an educational psychologist who displays good professional knowledge tempered with the warmth of empathy.

There are sections on the blind, the cerebral palsied and the deaf child, and an especially valuable one on growth of human relationships. Throughout, emphasis is placed on the importance of family care.

The book should be required reading for teachers, as well as for all those in medical fields who work with handicapped children. *(Harriet E. Gillette, M.D.)*

ORTHOPEDIC SURGERY IN INFANCY AND CHILDHOOD. By *Alfred B. Ferguson*, Jr., M.D. Cloth. Price, $15.00. Pp. 508, with illustrations. The Williams & Wilkins Company, Mt. Royal & Guilford Aves., Baltimore 2, 1957.

This book contains a great wealth of information on the various congenital and acquired conditions of bones, joints and related structures that afflict children. It does not include the management of fractures. The text is well and profusely illustrated.

The first six chapters of this book describe in a clear and concise way the conditions affecting the various segments of the body, which are presented in a regional arrangement. The treatment suggested shows mature thought and judgment. Conservative treatment is recommended only if it can be of real value, and should be continued only when it shows satisfactory results. Otherwise surgical correction is advocated.

The last four chapters are devoted to the affections of bone, muscles, nerve and neoplastic changes that may affect them. The chapter on the affections of bone, which is the most interesting, presents the complications arising from defective formation of bones from cartilage and from metaphyseal and diaphyseal, metabolic, general and congenital causes.

This book is highly recommended for all physicians regardless of their specialty, who treat children. It is of particular value to the physiatrist because it will serve as an authoratative reference for diagnosis and as a guide to treatment. *(Odon F. von Werssowetz, M.D.)*

SURGERY IN WORLD WAR II. General Surgery. Vol. II. Edited by Col. *John Boyd Coates*, Jr., MC. Leatherette. Price, $4.25. Pp. 417, with illustrations. Office of the Surgeon General, Dept. of the Army, Washington, D. C., 1955.

This well written volume covers in detail the story of extremely urgent abdominal surgery performed in forward army medical units during World War II. The clinical material reported is largely the experience of the Ind Auxiliary Surgical Group and covers 3,154 abdominal injuries reported in detail by types of anatomical wounds sustained; the histories analyzed are almost wholly combat-incurred non-transportable patients in need of resuscitation measures before operation could be performed. The book is divided into three parts dealing with resuscitation measures, initial surgery of abdominal wounds and colostomy. The chapters on control of pain and anesthesia for men wounded in battle are written by Henry K. Beecher, M.D., and are worthy of special comment, since they are provocative and extremely well-written.

The figures, illustrations and tables add much to the value of the book which should be required reading for every physician dealing with early and emergency care of the injured patient in these days of auto accidents and mass casualties. *(J. H. K., M.D.)*

SURGERY IN WORLD WAR II. Orthopedic Surgery, European Theater of Operations. Edited by Col. *John Boyd Coates*, Jr., MC. Leatherette. Price, $4.00. Pp. 397, with illustrations. Office of the Surgeon General, Dept. of the Army, Washington, D. C., 1956.

This book covers in detail the orthopedic care required by the 381,360 combat-wounded patients in the European Theatre of Opera-

tions during World War II. The evolution employment and success of the consultants' system as developed is discussed in detail in Part I. Description of the hospital system and reports of preparations for the D-Day invasion of Normandy are now history and serve no useful purpose in the book. Part II deals with the development of clinical policies and practices with special emphasis on amputations and compound fractures. It also constitutes the meat of the effort and deals with special types of bone and joint injuries, especially the hip and knee joints and outlines management including surgical procedures, in considerable detail.

The chapter entitled "Rehabilitation" is of especial interest to physiatrists and physical therapists and indicates the coming major of that word at an early date. The appendix containing the proposed revision of the manual of therapy (orthopedics) is worthy of special reading and constitutes an excellent manual on first aid. *(J. H. K., M.D.)*

CLINICAL ORTHOPAEDICS. Volume 8. Edited by *Anthony F. De Palma,* M.D. Cloth. Price, $7.50. Pp. 337, with illustrations. J. B. Lippincott Company, E. Washington Sq., Philadelphia 5, 1956.

This eighth volume of clinical orthopedics is as excellent as the previous seven volumes. The first section, which includes 13 articles, is devoted to the chronic hereditary diseases and developmental anomalies. McElvenny in his discussion of anomalies of the lumbar spinal cord and nerve roots emphasizes that an unexplained foot deformity with resistance to correction or an abnormal gait with no true pattern of known etiology should make one consider a lumbar cord abnormality. Browne's presentation on splinting for controlled movement is excellent and should be very interesting to physiatrists.

The second section is composed of 12 articles on general orthopedics, several of which are recommended to physiatrists. Of particular interest are the articles by De Palma and Cotler on "Hemophilic Arthropathy," McGovney's "Scapulocostal Syndrome" and Chittendon's "Problems Related to Prosthesis in Childhood." The third section is on motorist injuries and motorist safety. This is as good and thorough as it appeared in a previous edition.

In general each volume of this work always contains excellent articles which are of interest to physiatrists. Primarily, the value of these articles appears to be due to the method of the presentation of the subjects, which considers and applies the information gained through basic research to clinical practice using a common sense approach and bedside evaluation. This publication should be a part of the physiatrist's library. *(Odon F. von Werssowetz, M.D.)*

THE PATIENT SPEAKS. By *Harold A. Abramson,* M.D. Cloth. Price, $3.50. Pp. 239. Vantage Press, Inc., 120 W. 31st St., New York 1, 1957.

Here is a very interesting and concise book on psychoanalytic technic of a thirty-two year old female patient who was in constant conflict with her mother. The chapters represent the careful tape recording interviews with the patient with a brief resumé and commentary of the doctor. The book traces the entire life of the patient from childhood to motherhood and the influence of her inner conflicts on her asthma and eczema. The dominating and almost dictatorial power of the mother over her daughter aggravates her symptoms. The book clearly points out the possible influence of the psyche on a chronic disease. Even though it might be controversial as far as some dermatologists may be concerned, the patient's remarkable improvement leaves no doubt that the subject is worthy of consideration.

The author has gone through painstaking care to present the subject of psychoanalysis in its simplest and non-technical form. The book is not only recommended for the specialist in medicine but also for the general practitioners and ancillary groups. It is a great pioneer contribution to medicine.

medical news

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before date of meeting.

Grave Mistake if Society Does Not Make Use of Abilities of Handicapped, Pontiff Says

It would be a grave mistake if society did not make use of the limited abilities of the handicapped, His Holiness Pope Pius XII told thirty members of the International Society for the Welfare of Cripples.

"Man is born into society as a vital member, to make his contribution, according to his powers, towards the advancement of the common good," said the Pope, "and some men, and their number is not very small, are heavily handicapped by various physical disabilities. . . .

"It would be a grave mistake, as well as a sad lack of Christian charity, for society simply to discount their contribution. On the contrary, it is for the community to show a special interest in developing their limited abilities and, as far as is possible, placing them where they may gain a livelihood and share the joys of a normal human life."

The International Society for the Welfare of Cripples, a federation of more than 30 voluntary national organizations, is an "apostolate of charity, truly an apostolate deserving the admiration of all men," said the Pope.

While calling God's blessing upon the work of the society itself, the Pontiff also used the occasion to express his affection for those whom the society serves.

Appoint Physical Medicine Administrator

Dr. John L. Enyart, who retired as U. S. Naval Surgeon, Medical Branch, Supreme Headquarters Allied Powers Europe (NATO Forces) Paris, in June, has been appointed administrator of the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center. Dr. Enyart served at the Royal Naval College Hospital, Dartmouth, England, in 1943-44. He was staff surgeon Naval Forces, France, 1944-1945 and executive officer of U. S. Naval Hospital, Philadelphia, 1945-1946. Dr. Enyart served with the National Advisory Group to Nationalist China from 1946 to 1948 and was commanding officer of the U. S. Naval Hospital, Newport, R. I., from 1953 until his appointment to NATO.

University of California, Los Angeles, Medical Center Prosthetics Education Program

Schedule of prosthetics courses for prosthetists, therapists, and physicians to be offered in the Fall and Spring semesters, 1957-1958.

Courses for Prosthetists

Jan. 13-Jan. 24
Clinical Prosthetics: Above-Knee Amputations

Mar. 10-Mar. 21
Clinical Prosthetics: Above-Knee Amputations

June 2-June 20
Clinical Prosthetics: Upper Extremities Amputations

Courses for Therapists (Physical, Occupational)

Jan. 20-Jan. 24
Clinical Prosthetics: Above-Knee Amputations

Mar. 17-Mar.21
Clinical Prosthetics: Above-Knee Amputations

June 16-June 20
Clinical Prosthetics: Upper Extremities Amputations

Courses for Physicians

Dec. 9-Dec. 13
Clinical Prosthetics: Above-Knee Amputations

Mar. 17-Mar. 21
Clinical Prosthetics: Above-Knee Amputations

June 16-June 20
Clinical Prosthetics: Upper Extremities Amputations

For further information write to: Prosthetics Education, B4-229, Medical Center, University of California, Los Angeles.

The Prosthetics Education Program is entirely supported through a direct grant from The Office of Vocational Rehabilitation of the Department of Health, Education and Welfare of the United States government. The Office of Vocational Rehabilitation has made a limited number of traineeships available through the University to assist students wanting to enroll in prosthetics courses. Evidence of need for such support must be furnished on forms which will be supplied on request.

Schedule of Prosthetics Courses for Prosthetists 1957-1958

Jan. 13-Jan. 24
Clinical Prosthetics: Above-Knee Amputations — Prosthetists

Jan. 20-Jan. 24
Clinical Prosthetics: Above-Knee Amputations — Physicians and Therapists

Mar. 3-Mar. 7
Orthopedic and Prosthetic Rehabilitation

Mar. 10-Mar. 21
Clinical Prosthetics: Above-Knee Amputations — Prosthetists

Mar. 17-Mar. 21
Clinical Prosthetics: Above-Knee Amputations — Physicians and Therapists

Mar. 24-Mar. 28
Orthopedic and Prosthetic Rehabilitation

May 5-May 9
Orthopedic and Prosthetic Rehabilitation

May 19-May 23
Orthopedic and Prosthetic Rehabilitation

June 2-June 20
Clinical Prosthetics: Upper Extremities Amputations — Prosthetists

June 16-June 20
Clinical Prosthetics: Upper Extremities Amputations — Physicians and Therapists

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Civil Service Opening

The United States Civil Service Commission has announced an examination for physical therapist for filling positions principally in the United States Public Health Service and Indian Health Hospitals throughout the United States and Alaska, and in the District of Columbia Government and St. Elizabeth's Hospital in Washington, D. C. The salaries range from $3,670 to $4,970 a year.

Applicants must be graduates of A.M.A. approved schools of physical therapy (or expect to be graduated within 3 months), and, for positions paying $4,525 and $4,970 a year, they must have had professional experience as a physical therapist.

Full information and application forms may be obtained at many post offices throughout the country, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted by the Board of U. S. Civil Service Examiners, U. S. Public Health Service, Department of Health, Education and Welfare, Washington 25, D. C., until further notice.

College Students Show No Diphtheria Immunity

A routine diphtheria "shot" is needed by many students entering college, Dr. Ruth E. Boynton, Dr. Donald W. Cowan and Paul Rupprecht, University of Minnesota Health Service, Minneapolis, report in the *Journal of the American Medical Association* (Aug. 24).

A survey of new students entering the University in one year disclosed that nearly half of them had no immunity against the dangerous disease. This was in spite of the fact that the state of Minnesota has had a long-time program of diphtheria immunization. These findings substantiate other studies that have shown adults to have a high degree of susceptibility to diphtheria. Susceptibility was tested with the standard Schick test and over 47% of the students gave a positive reaction to it. A positive reaction means that the body has too little or no immunity.

All of the students who were Schick positive were immunized against the disease. In the past, the possibility of severe reactions has always been a deterrent to inoculating adults but the student group responded well.

Many of them got mild reactions to the shot but they were not severe enough to rule out the routine use of the inoculations, the authors conclude.

Reports Intramuscular Iron Ends Dangers of Intravenous Therapy

A new parenteral preparation to combat iron-deficiency anemia apparently without the hazards of intravenous therapy is reported on by a specialist of the Mayo Foundation. The preparation is administered intramuscularly. The study by Dr. Albert B. Hagedorn appears in the *Journal of the American Medical Association*. It deals with the treatment of adult patients ranging in age from 35 to 73 years.

Dr. Hagedorn reports Imferon (Lakeside) is "an effective iron preparation for intramuscular injection. Patients prefer this mode of administration over intravenous administration." At the same time, Dr. Hagedorn stresses "intramuscularly given iron is preferable to intravenously given iron . . . because of the innate potential dangers of any intravenous therapy." The Mayo specialist declares that "to date this intramuscularly given iron preparation has been found to be free from any toxic reactions, either local or systemic." This contrasts with "some minor reactions experienced with intravenously given iron," he says. The total dose of intramuscularly given iron element in the study ranged from 750 to 2000 mg.

Whiplash Neck Injury Stopped

A car headrest that prevents whiplash injuries of the neck during highway accidents was recommended by Dr. Albert D. Ruedemann, Jr. of Detroit, in the *Journal of the American Medical Association* (Aug. 24).

Whiplash injuries occur when a car is struck in the rear and its occupants have their heads snapped back. Both super highways and the new lower seat models are factors causing an increasing number of such injuries, Dr. Ruedemann reports.

The headrest is six inches wide, six inches high and is fitted on the top of the present seat. It follows the backward curve of the seat so that the driver cannot rest his head on it and become drowsy. An experimental model that can be screwed to the seat frame and is removable was made by officials at the Chrysler Corporation. It should be used along with a shoulder-type seat belt to keep the body from being thrown forward, Dr. Ruedemann recommends.

Brain Goes Without Oxygen

The successful recovery of a man whose brain had gone without oxygen for nearly 20 minutes, instead of the accepted limit of five minutes, is reported by four Illinois scientists in the *Journal of the American Medical Association* (Aug. 10).

The patient was a 24-year-old man whose brain was oxygen-starved for 19½ minutes while a gunshot wound in his heart was being repaired.

During the operation the patient suffered several severe hemorrhages in an artery leading to the brain, including one which kept him in a shock-like state for the 19½ minutes.

An electroencephalograph, attached to his brain during the operation, showed that electrical activity in the brain's cortex or outer layer stopped altogether during this time. The stoppage was apparently due to the lack of blood flow.

The patient's safe recovery was attributed to the use of both hypothermia and the tranquilizer chlorpromazine, both of which served to protect the brain. In hypothermia, the temperature of the body is reduced so that its functions are slowed and it requires less oxygen during surgery.

A battery of psychological tests was given the patient before and after the surgery, and the results showed that the operation caused no significant change in his mental abilities.

The unusual case is reported by Drs. Robert L. Tentler, Max Sadove, Dorothy R. Becka and Robert C. Taylor of the VA Hospital, Hines, Ill.

Philadelphia Association for Blind Announces New Children's Leaflets

The Philadelphia Association for the Blind announces the publication of three new leaflets particularly pointed toward the care of children's eyes: "Cross-Eyes," "Check Your Child's Eyes," and "What's the Score on Your Infants' Eyes?". These leaflets have been designed to complement a complete program in the greater Philadelphia Area themed to the slogan of "Regular Eye Examination Today" — "HEALTHY EYES FOR TOMORROW." Parents are especially urged to have their children's eyes examined regularly and they are cautioned to watch for these six warning danger signs in their children's eyes: cross-eyes; headaches and nervousness; red, watery, itchy eyes; rubs eyes often; squints when looking at objects; holds head to one side.

Other leaflets published by the Philadelphia Association for the Blind are: The Eye in High Blood Pressure; Truth About Eye Surgery; Eye Accidents; Diabetes Can Cause Blindness; What is a Cataract?; Why Glasses?; Danger Ahead — Glaucoma; Blindness Doesn't Just Happen; The Philadelphia Association for the Blind; Handle With Care; Take Time To See! Individuals and organizations wishing sample copies of these leaflets may write to Philadelphia Association for the Blind, 100 E. Price St., Philadelphia 44, Pa. ATTN: Prevention of Blindness Department.

Reducing Pills Described as Fraudulent

Reducing pill promoters are too fast for the government and "make a killing" on a gullible public before they can be stopped.

This was reported by Miss Maye A. Russ, director of the food, drug and cosmetic division, National Better Business Bureau, Inc., New York, to a House subcommittee studying false and misleading advertising.

When the government finally does catch up with the promoters they will quickly agree to discontinue the sale of the product and then, "in contemptuous disregard" of the law, start campaigning for a similar drug or the same one marketed under a different name.

The whole field of weight-reducing products is full of deception and outright fraud, and is particularly fertile for promoters because of the great number of persons worried about their weight, Miss Russ said.

None of the known weight-reducing products sold over the counter will in themselves cause a person to lose extra pounds. This can only be done by reducing the number of calories taken in through food.

Many products claim to induce the user automatically to eat less food. Almost in-

variably, however, these products are accompanied by a "plan" that requires the user to follow a restricted diet.

Many of the current so-called "miracle" drugs contain the compound phenylpropanolamine hydrochloride which was reported in 1939 as successful in curbing appetites. But the amount of the drug contained in reducing pills is far below the amount originally reported on.

The Post Office Department has forced many of the companies to discontinue the mail order sales of their products, but in some cases vigorous promotion of the products still goes on in drugstores.

Miss Russ called for a stronger Medical Fraud Unit of the Post Office Department and for greater use of criminal Prosecution by the Department of Justice.

New Program of Financial Support

The Public Health Service announced a new program of financial support for advanced training of research scientists in the field of neurological and sensory disorders. The new program, designed to help research scientists obtain additional specialized training for careers in teaching or research, will be conducted by the National Institute of Neurological Diseases and Blindness, of the Service's National Institutes of Health, Bethesda, Md. A previous program, under which about 75 scientists received advanced training during the last fiscal year, was concerned exclusively with clinical training. The program announced is designed to encourage advanced training in either the clinical area or in such basic science areas as neurochemistry, neuropharmacology, neurophysiology or neuroanatomy.

Individual awards under the program generally will be made for not less than nine months and for not more than one year. However, all awards are subject to renewal and may be continued for a period of three years. Stipends are determined individually in accordance with each applicant's qualifications and training needs. Such stipends may range from $5,500 to $14,800 a year.

Application forms and instructions may be obtained by writing to the Chief, Extramural Programs Branch, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda 14, Md.

Applicants must be citizens of the United States or must have filed declarations of intent to become citizens. They must be free of any physical or mental disability that would interfere with the proposed training. In addition, they must have completed either (1) the residency training requirements in a clinical specialty, or its equivalent or (2) at least three years of pertinent postdoctoral training or research experience.

Special traineeships may be awarded for training at any institution in the United States or abroad qualified to give the particular training desired by the applicant.

The trainee may begin training at any time within ten months of the date of his award. During the period of training, the trainee will not be permitted to carry on the private practice of medicine; he may engage only in such teaching, clinical and research activities as are a prescribed part of his training program.

"Growth Rings" in Snake Bones

Bones of living creatures may show dry and wet seasons in somewhat the same manner as "growth rings" on trees.

Dr. Frank E. Peabody, zoologist at the University of California at Los Angeles, finds this is possible after studying a matching series of annual growth rings in several head bones of a Kansas bullsnake.

The snake bone growth rings consist of 11 narrow winter zones and 12 broad, summer zones, Dr. Peabody reports. Winter zones show a tendency to become wider and to appear double, suggesting a small, local increment of growth following the regular growth season — perhaps reflecting Indian summer.

In the middle of the 11½-year record in bone are two summer zones which are unusually narrow. Inasmuch as the bullsnake was known to have been killed in a specific year, 1931, the two summers of deficient growth during its midlife can be identified with reasonable accuracy as the summers of 1925 and 1926, according to Dr. Peabody.

The UCLA zoologist checked weather records of the area in which the snake lived and found severe droughts occurred in these two summers.

Thus the narrow growth zones may reflect a crisis in the snake's food chain. The drought affected summer vegetation and in turn the number of rodents on which the snake feeds.

Johns Hopkins University to Revise Medical Curriculum

A revised program of medical education, which will reduce the period of study and emphasize the humanities, is scheduled to begin at the Johns Hopkins University School of Medicine in the fall of 1959. The plan cuts two years from the training period for a carefully selected group of students and shortens the course for others by one year.

A total of $10 million was granted by the Public Health Service, the Ford Foundation, the Rockefeller Foundation, the Commonwealth Fund, and by other private sources for the construction of a new basic science building and for additional faculty.

Program objectives are to shorten formal medical education without sacrifice of quality; to overcome the barrier between the liberal arts and the medical sciences; and to encourage students to follow careers in the basic medical sciences, such as physiology, anatomy, and pharmacology, in which there is the greatest shortage of teachers and research workers.

Candidates with adequate "motivation and maturity" who have completed two years of college will be permitted to enter medical school, where they will pursue a five-year course. During the first three years of medical school, they will continue studies in the liberal arts, at the end of which they will receive the bachelor of arts degree.

Students accepted after three or four years of college will begin medical school with the second year of the five-year program.

For all students the last year of medical school will be combined with the first year of internship at the Johns Hopkins Hospital. In addition to 24-hour responsibility for patients, the student will have a two-month elective period for work in the basic sciences or further clinical training in any of the hospital departments.

Although the years of medical training are reduced, with a consequent cut in medical education costs, the actual period of training is shortened relatively little. The academic year is increased from the present 32 weeks to 40 weeks; the fifth year covers 50 weeks.

Newly Registered Therapists

August 30, 1957

Addison, Russell G., 319 W. Oxford St., Alliance, Ohio
Beran, Russell E., 426 Second Ave., S. E., Rochester, Minn.
Bernal, Maria E., 48-39 Gerard Ave., S., Minneapolis
Bobb, Marvin L., 519 5th Ave., S. W., Rochester, Minn.
Cochrane, Ladd L., 16 5th Ave., N. W., Rochester, Minn.
Dodge, Sally M., 99 Richards Rd., Columbus, Ohio
Ellis, Loucilla, 511 Hope St., Durham, N. C.
Garman, Joyce C., 159 N. W. 5th St., Largo, Fla.
Guscott, Gilbert J., 702 First Ave., S., Fargo, N. D.
Heard, Pheobia L., 813 Second St., S. W., Rochester, Minn.
Hines, Betty Lou, 402 Oak St., Sylacavga, Ala.
McIntyre, Mary Ann, 908 S. 20th St., Lafayette, Ind.
Muscle, Jean S., 44 S. Fifth Ave., Highland Park, N. J.
Nickerson, Ruth E., 108 N. 12th St., Clear Lake, Iowa
Nowak, Marian L., 63 Louis St., New Brunswick, N. J.
Olsen, Joyce D., 5035 S. 27th St., Milwaukee
Pruitt, Ann F., 720 E. Main St., Georgetown, Ky.
Pullie, Eunamae, 24 Lake St., Belleville, N. J.
Rathbun, Lois Ann, 2005 Lansing, Caldwell, Idaho
Sellberg, Beverly Ann, 35 Welch Dr., Forestville, Conn.
Smith, Elsie W., 21 Parkwood Dr., Savannah, Ga.
Smith, Jerry L., 5790 Lincoln, Detroit
Ulrich, Patricia G., 716 Flint St., Laramie, Wyo.
Verma, Sushil K., 114 Fourth Ave., N. W., Rochester, Minn.
Yuhas, Geraldine R., Rt. 1, Helena, Mont.

September 4, 1957

Aller, Robert A., 332 W. LaCrosse St., Tomah, Wis.
Barron, Pamela J., 2020 S. Hillside, Wichita, Kans.
De Scisciolo, Angelo A., PT Dept., Instit. of PM&R, 400 E. 34th St., New York
Hay, Pauline L., 703 Strait Ave., Worthington, Minn.
Hill, Joan S., 1809 Briarcliff, Emporia, Kans.
Johnson, Susan E., Briager, Mont.
Truestedt, Giseta C., 216 W. Comstock Hall, Minneapolis

Six Month Post-Graduate Course: January 6 - June 27, 1958 Physical Medicine and Rehabilitation

Purpose: To provide didactic and applicatory training in the principles and practices of physical medicine and rehabilitation with particular emphasis on chronic illness.

Location: Highland View Hospital, Cleveland, Ohio. Highland View Hospital is one of the few chronic disease general hospitals in this country. In addition to all facilities and departments indigenous to the acute hospital, Highland View Hospital has a large and complete department of physical medicine and rehabilitation. The hospital has a patient capacity of 556. More than half of these patients receive daily treatment in the department of physical medicine. The patient's program is coordinated from hospital admission to follow-up planning using rehabilitation methods. An expanding research staff is presently working on projects in nutrition,

vocational placement, neurophysiology, and psychology.

For: The course is designed for the graduate physician. The resident or diplomate in a specialty allied to physical medicine will find the course particularly valuable in giving him a further tool to use in the practice of his own specialty. The beginning physical medicine resident who takes the course will acquire a basic foundation of knowledge on which to build his further training. This curriculum is not meant as a full course in physical medicine and rehabilitation, but as an adjunct to training programs in this and other specialties. It is particularly hoped that the physician planning to teach in an allied field will add this post-graduate series to his basic knowledge of his own subject.

Section No. 1: Six weeks
Lecture: 42 hours
Conferences: 24 hours
Wards and Clinics: 114 hours

The student will be introduced by lecture and demonstration to the basic principles of physical medicine and rehabilitation, including upper and lower extremity bracing, crutch walking, therapeutic modalities, goniometry, muscle testing, therapeutic exercise, occupational therapy, and physical medicine prescription writing. Concomitant lectures will be given for basic review of anatomy and kinesiology, and for an introduction to the use of rehabilitation methods in specific disabilities beginning with hemiplegia, spinal cord injury and multiple sclerosis.

Ward and clinic time will be supervised and will be used for an introduction to the use of a team approach in rehabilitation of severe disability and chronic disease. During this section the student will have minimal individual patient contact and responsibility, but will observe in treatment clinics, conferences and rounds.

Certain activities will be scheduled throughout all sections of the course. These will include weekly an Orthopedic-Rehabilitation Conference, a Physical Medicine and Rehabilitation Journal Club, and the general, educational staff meeting at Highland View Hospital.

Each student's program will be planned individually so that he may concentrate his non-didactic training hours on those subjects most closely relating rehabilitation to his own type of practice or study.

Section No. 2: 12 weeks
Lecture: 64 hours
Conferences: 72 hours
Wards and Clinics: 162 hours
Affiliations: 54 hours

Lectures will concentrate on physical medicine in specific disabilities, including cerebral palsy, amputations, poliomyelitis, primary diseases of muscle, and backache. The student will be introduced in detail to the ancillary members of the rehabilitation group — speech therapy, psychology, vocational guidance, and social service.

During the ward and clinic periods the student will spend most of his time at Highland View Hospital, where special emphasis will be given to the management of severe disability and chronic illness. Increasing patient responsibility will be delegated during this section, though the physician will have no true service functions.

The student will be assigned for one half day a week for six weeks to each of the following institutions: Cleveland City Hospital Respirator Care and Rehabilitation Center — for observation of care of respirator poliomyelitis patients and for review of respiratory physiology; Cleveland Clinic and Cleveland Clinic Hospital — for observation of physical medicine and rehabilitation outpatient service and associated patient disabilities, and VA Hospital — for observation of the paraplegia center and further uses of ancillary personnel in physical medicine and rehabilitation.

Section No. 3: 8 weeks
Lecture: 32 hours
Conferences: 40 hours
Wards and Clinics: 168 hours

Increasing attention will be focused on the broad problems of severe disability and chronic disease. The student will be introduced in detail to the community facilities aligned for the care of rehabilitation patients. Lectures and panels will discuss the further relationship of the psychologist and psychiatrist to the rehabilitation team. Field trips will be taken to community institutions using rehabilitation methods, and community planning for rehabilitation will be discussed.

Ward and clinic work will be correlated with lecture and field trip material, giving the student an opportunity to concentrate on patient problems which will eventually involve the community. Research methods in rehabilitation will be reviewed.

Application: Write Mieczyslaw Peszczynski, M.D., Chief, Department of Physical Medicine and Rehabilitation, Highland View Cuyahoga County Hospital, Harvard Road, Cleveland 22, Ohio.

Fellowships: Fellowships are available for this course from the Office of Vocational Rehabilitation, Department of Health, Education and Welfare. Application should be made to Highland View Hospital by those interested in fellowships.

Highland View Hospital is approved by the American Medical Association and the American Board of Physical Medicine and Rehabilitation for three years of residency in physical medicine and rehabilitation.

Organic Compounds Worthless Against Colds

Citrus flavonoids are of little or no value in treating the common cold or any other disease, Dr. William N. Pearson, Vanderbilt University School of Medicine, Nashville, Tenn., reports in the *Journal of the American Medical Association* (Aug. 10).

The report was made to the AMA Councils on Foods and Nutrition and Drugs and was prompted by the recent upsurge of interest in the flavonoids.

Flavonoids are organic compounds widely distributed in nature as coloring in flowers, fruits, tree barks and vegetables. The most important commercial source for them is citrus rind. They have been advertised as effective in treating the common cold.

Reports on several small studies were enthusiastic about the effect of flavonoids on common respiratory infections, because of their supposed ability to strengthen capillary walls. Detailed studies do not confirm this.

The compounds do appear to have some effect on strengthening capillary and blood vessel walls and to possess some mild blood-vessel-constricting effects, but these properties are weak when compared to those of other available drugs, Dr. Pearson reports.

The flavonoids' effects on such diseases as hypertension, diabetes, rheumatic fever, arthritis and various blood diseases have been studied but the testing procedures have been generally unreliable.

"Those workers who claim therapeutic value for the flavonoids have not supported their claims with data obtained from well-controlled clinical studies," Dr. Pearson reports, concluding that until such studies are made the flavonoids have to be considered of doubtful value.

Primer for Paraplegics and Quadriplegics

A booklet designed to explain to patients with spinal cord injury and their families facts about their disability as well as methods, practices and philosophy that can prove helpful in their daily lives, has been published by the Institute of Physical Medicine and Rehabilitation of New York University-Bellevue Medical Center. The 38-page manual, entitled "Primer for Paraplegics and Quadriplegics," is the first of a new series of patient publications concerned with specific disabilities which will be issued by the Institute.

The manual was prepared by Dr. Seymour S. Bluestone, now director of the New York State Rehabilitation Hospital, with the assistance of senior faculty members of the department of physical medicine and rehabilitation of NYU College of Medicine. Material for the booklet was obtained over the past ten years from correspondence with more than 1,000 paraplegic and quadriplegic patients as well as from studies made by the professional staff of all the Institute's services. In addition to discussing the very specific problems faced by one with total or partial paralysis from spinal cord injury, the manual familiarizes the reader with opportunities available through The Office of Vocational Rehabilitation of the U. S. Department of Health, Education and Welfare, and the National Paraplegic Society. Copies of "Primer for Paraplegics and Quadriplegics" can be purchased for fifty cents from the Institute of Physical Medicine and Rehabilitation, 400 E. 34th St., New York 16.

Amnesia Victims Usually Get Memory Back Easily

Sudden loss of memory, or amnesia, is a temporary condition that usually disappears without treatment in a few days, Drs. Alexander Kennedy, University of Edinburgh, and Joseph Neville, King's College, Newcastle upon Tyne, report in the *British Medical Journal*.

A study of 74 cases of amnesia that turned up at either hospitals or police stations showed that simple psychotherapy, such as suggestion, directed discussion, or quick hypnosis could bring the patient's memory back rapidly.

Amnesia victims are surprisingly easy to hypnotize and can then be made to relive incidents in their past, while supplying a running commentary about them. The subjects are brought out of the hypnosis while talking about themselves and realize that their memory has returned.

Amnesia patients seem to be flying a distress signal and throwing themselves on the mercy of the community or of the hospital to which they came, the doctors believe.

The patients unconsciously hope that someone will apply the patience and imagination to their problems that they themselves do not possess.

But their cooperation is often difficult to obtain, the physicians explained. They were relieved of their problems by the "magic" of memory loss and prefer to remain dependent on the "magician" rather than resume the responsibility for their own lives.

Amnesia is caused by both organic brain disturbances and emotional upsets. Sometimes both conditions were found in one patient and it was difficult to tell which actually caused the memory loss.

Psychological causes of memory loss are frequently situations relating to marriage, bigamy, debt, or other financial troubles where there is an element of fear or conflict. Rather

than face the situation, the patient just blots it out of his mind by forgetting it completely.

This type of amnesia rarely lasts longer than a few hours or days and may or may not include the loss of identity.

Frozen Animals Brought to Life

A "rewarming" technic that may speed the day when a living human can be safely frozen for weeks at a time has now been found successful in animals.

The rewarming method was used on laboratory rats that had been kept at near freezing temperatures for as long as one hour after their heart beats and breathing had stopped.

It is reported by Dr. John Hunter, Defense Research Medical Laboratories, Toronto, Canada, in the *Canadian Journal of Biochemistry and Physiology*.

The essential parts of the method are to have the animals breathe a high concentration of carbon dioxide gas while they are being cooled and then to revive them with artificial respiration or ventilation, using a high concentration of oxygen.

Unless forced breathing is maintained during the initial stages of warming, normal respiration will not return, Dr. Hunter reports.

Until recently, it was thought that cooling mammals this much would be fatal. Since 1951, other scientists have been able to reanimate rats cooled to near freezing, but they believed it was imperative to rewarm the chest wall first.

In this way, it was thought that the metabolism of the rest of the body would be kept low until a functioning heart could re-establish blood flow.

With artificial ventilation, however, the chest rewarming is unnecessary.

As the body temperature approaches freezing, breathing slows down and stops. Then the regular beating of the heart is lost, although there are still occasional beats every minute or so. Finally, the heart stops completely.

With rewarming and artificial ventilation, heart rhythm returns in six to ten minutes followed by regular breathing in another 20 minutes or so.

Course on Basic Concepts of Rehabilitation

A course, "Principles of Rehabilitation," will be conducted by the Rehabilitation Center of the Hospital of the University of Pennsylvania in cooperation with the Office of Vocational Rehabilitation, United States Department of Health, Education and Welfare. The five-day course will be presented on the following dates: December 2-6, 1957, February 3-7, April 7-11, and June 16-20, 1958 (reserved for physicians).

The course is open to physicians, registered nurses, occupational therapists, social workers, rehabilitation counselors, and others concerned with rehabilitation of the handicapped. Enrollment for each of the four sessions will be limited. The course is designed to present the basic concepts of rehabilitation in all its aspects. Principles and methods are presented through lectures, clinical demonstrations and group discussions. The instructional staff includes representatives from the various divisions of the University of Pennsylvania and guest lecturers. Provisions for granting a limited number of trainee stipends to eligible persons attending the course have been made by the U. S. Office of Vocational Rehabilitation. Requests for detailed information may be addressed to the Rehabilitation Center, Hospital of the University of Pennsylvania, Philadelphia 4.

Publication on Disabled Puerto Ricans

The Institute of Physical Medicine and Rehabilitation of New York University-Bellevue Medical Center announces the publication of Rehabilitation Monograph XII, "The Vocational Rehabilitation Problems of the Disabled Puerto Ricans in New York City," by Victor D. Sanua, Ph.D., with Leonard Diller, Ph.D.; Alice Loomer, M.A., and Martin E. McCavitt, Ed.D.

The material for this 69-page study was obtained from interviews with discharged patients of the Institute of Physical Medicine and Rehabilitation, representatives of many New York agencies, and information supplied from records of the New York State Division of Vocational Rehabilitation. Among the New York agencies were six rehabilitation centers, four public health clinics, four employment offices and five general hospitals. The study was made possible through a grant from the Office of Vocational Rehabilitation of the Department of Health, Education and Welfare.

The major findings of this study are: (1) approximately the same number of Puerto Ricans as non-Puerto Ricans complete rehabilitation training to the point of employment; (2) more Puerto Ricans receive vocational training in the course of rehabilitation which is of particular value in bringing their salaries close to that of the non-Puerto Rican group; (3) welfare or compensation status does not affect the success of rehabilitation; (4) there are significantly more cases of tuberculosis among the Puerto Ricans studied, but fewer cardiac or mental cases; (5) there is an urgent

need for more knowledge of Spanish and Puerto Rican culture among agency workers; (6) the Puerto Rican should be encouraged to learn English from his first hospital contact and to familiarize himself with the new environment and customs, and (7) the Puerto Rican often needs special handling because of his initial fears of agencies and his pressing financial problems.

Copies of this monograph can be purchased at $1.00 each from the Institute of Physical Medicine and Rehabilitation, 400 E. 34th St., New York 16.

Report of the Committee on Rehabilitation*

The following report, which has been reviewed by the Board of Trustees of the American Medical Association, has been adopted for publication by the Association's Committee on Rehabilitation.

RALPH E. DE FOREST, *M.D., Secretary*

During the past 50 years medicine has made rapid advances in its ability to save the lives of the sick and injured. In this period our life span has been increased by more than one-third. A longer life span, together with a growing population and the increased number of persons injured during their daily activities of work and play, has resulted in a tremendous rise in the number of disabled individuals. The disabled and handicapped may become a burden on their families or society and may, even more unfortunately, become engulfed in their own feelings of insecurity, despair, and hopelessness. In response to the needs of the disabled and handicapped, a humanitarian movement, "rehabilitation," has developed and continues to expand in the United States. Since rehabilitation services are provided in so many ways, some confusion exists as to what is meant by and included within this term. However, some confusion is to be expected during the course of the expansion and development of almost any concept of such magnitude as that encompassed by present-day rehabilitation.

Stated in broad and simple terms, rehabilitation services provide the total medical care needed to restore the sick and injured to maximal obtainable function, assist in psychological and social adjustment, provide occupational retraining if necessary, and either secure employment if possible, or at least strive to develop independence so that the individual may become self-sustaining. Success in rehabilitation is dependent, then, upon comprehensive care, including (1) medical and surgical diagnosis and treatment which must continue beyond the end of the "acute stage" of disease or injury to the point of maximal reduction of physical or mental disability, (2) social service, (3) vocational retraining and counseling, and (4) job placement.

There is need for increased utilization of the many ancillary personnel such as physical therapists, occupational therapists, clinical psychologists, and others who work under direct medical supervision. The physician also needs to become aware of the great amount of work already done in the nonmedical aspects of rehabilitation in the fields of education, sociology, and vocational counseling and placement. This is necessary because, in addition to the medical care provided by the physician, the patient must also receive the benefits of these other fields dedicated to the betterment of the disabled. It seems reasonable to assume, however, that the physician should accept leadership in seeing that adequate and total rehabilitation services are available to his patients. The physician should take the lead and direct the rehabilitation team if the important, traditional physician-patient relationship is to be maintained and his patients are to receive all of the benefits total rehabilitation has to offer. To assure that ancillary personnel are adequately trained to assume their responsibilities as members of the rehabilitation team, physicians should also actively participate in teaching the medical aspects of educational programs for such personnel.

Every individual physician can and should assume responsibility for the rehabilitation of his patients. Accomplishment does not depend so much upon the rehabilitation center as it does upon the mobilization, integration, and provision of rehabilitation services. The physician should ascertain what rehabilitative, community, and specialized medical services are available, and direct his patient to them as necessary. Although both federal and private national organizations are interested in rehabilitation, actual service is provided to the individual at the local level. County and state medical societies should catalogue for the benefit of their members the various medical, social, and educational agencies providing services to the rehabilitee within the state, county, and community.

The Committee believes that its activities in the development of rehabilitation should proceed with the following objectives as guides to its work: (1) to coordinate the rehabilitation interests and activities within the councils, bureaus, committees, and departments of the American Medical Association; (2) to foster medical supervision of rehabilitation services and centers; (3) to study the problems and interrelationships of the medical, social, educational, and vocational aspects of rehabilitation; (4) to inform the medical profession of the availability of information regarding rehabilitation; (5) to collect information concerning the establishment of

rehabilitation programs, their organization, methods of operation, and utilization by physician and patient; and (6) to encourage medical society interest and programs in rehabilitation.

In the process of carrying out this work, the Committee believes that some of the activities in which it might engage are as follows: (1) a review of the rehabilitation programs of national organizations through a perusal of written and published material and through conferences with representatives from these organizations; (2) a preparation of guides for medical societies to use in (*a*) reviewing the rehabilitation programs of local agencies and foundations, including availability of facilities and services and the extent and type of research, (*b*) determining the need for facilities and services, and (*c*) developing liaison with local groups concerned with rehabilitation; (3) the preparation of guides for sound rehabilitation services and facilities; and (4) publication of a series of articles in THE JOURNAL of the American Medical Association on all aspects of rehabilitation. Such articles would be prepared by persons well qualified in the various aspects of rehabilitation.

Members of the Committee on Rehabilitation are Frank H. Krusen, M.D., Chairman; H. B. Mulholland, M.D., Vice-chairman; Oscar A. Sander, M.D.; Francis J. Gerty,* M.D.; and Guy A. Caldwell, M.D.

*Reprinted from J.A.M.A., pp. 2045, August 31, 1957.

Paralympics Draw Sportsmen of Twenty-four Nations*

Aylesbury, England — For two days each year in July the broad green sports fields of the Stoke Mandeville Spinal Injuries Center here are filled with un-English faces and a clamor of strange languages. These are the days when Dr. Ludwig Guttmann, director of the Center, conducts his unique experiment in rehabilitation, the Stoke Mandeville Games.

The Games are the paraplegics' Olympics, nicknamed the Paralympics. This year paraplegics from five continents competed in wheel-chair versions of archery, javelin-throwing, and basketball, and in swimming and other events. They came from Malaya, Pakistan, Finland, Turkey, and the U. S. A.; they came from Germany and France, from Israel, Egypt, and Argentina. Many were paralyzed in wars against each other, and their long journeys to play together mean a great deal to them.

Dr. Guttmann has been a believer in the use of sports in rehabilitation since shortly after he organized the Stoke Mandeville Center, in 1943. At that time the usual method of treatment in paraplegia involved immobilization by plaster casts and braces.

Gentle to Active Sports

Faced suddenly with a large number of wartime spinal injuries, he became convinced that if his patients were ever to achieve independence, they must develop a compensatory strength and skill of the upper body. To that end he began to experiment cautiously with sports suitable for paraplegics — at first with "gentle" sports like billiards and darts; then with archery, table tennis, and wheel-chair versions of basketball and polo.

His satisfaction with the program was reflected in what he wrote about wheel-chair polo in the *British Journal of Physical Medicine* in 1946: "It not only exercises the whole of the upper part of the body and promotes great improvement in the circulation in both the normal and paralysed areas of the body, but also requires quick thought and good judgement and thus keeps the man's intelligence and concentration lively."

Organized Competition Early

As soon as he was convinced of the value of sports in rehabilitation, Dr. Guttmann began to think of organized competition. In ordinary sports for the able-bodied it is considered natural that standards should rise steadily, since athletes pit themselves each year against last year's records. Dr. Guttmann hoped to achieve the same improvement among the paralyzed by bringing them together in their athletic events.

In 1946 the first Stoke Mandeville Games were held, with 26 competitors from British hospitals, and in 1951 the Games were put on an international basis when a team of Dutch war veterans flew to Stoke Mandeville in order to compete.

The growth of the Games has satisfied Dr. Guttmann's ambitious hopes. The two nations competing in 1952 had become 24 by 1957; the 130 contestants had become more than 300. The 1957 Games included 11 sports: archery, foil fencing, basketball, swimming, snooker, table tennis, javelin-throwing, a crutch-walking race, archery darts, shot-put, and — for display — Indian clubs.

Dr. Guttmann's hypothesis that competition in standard tournaments with recorded results raises the levels of performance has been justified by the steady rise in scores. In archery, for instance — which Dr. Guttmann considers particularly suited to the rehabilitation of the paraplegic because it involves the use of precisely those shoulder, arm, and trunk muscles most necessary in maintaining balance — a team must now shoot, in order to win, more than double the winning score of the 1946 team. Paralyzed archers, in fact, have now begun to compete outside the Games on equal terms with able-bodied teams.

A Premature Record

Occasionally, as in the Olympics, a record "ahead of its time" will stand for several years running — like the spectacular 65 foot, 4 inch throw of the Dutch javelin-hurler Kruidenier in 1955, still unequaled — but many records fall every year.

One problem peculiar to rehabilitative sports that the staff at Stoke Mandeville must face is the difference in abilities among paraplegics, depending on whether the paralyzing lesion is high or low on the spinal cord. They have tried to compensate for this by dividing the competitors into classes according to the level of lesion.

Thus javelin-throwing is divided into two classes — one for lesions at T10 or below, another for those above — and table tennis is divided into three: cervical, high thoracic, and lower.

As in the weight divisions in professional boxing, a competitor may enter a class higher than his own but not one lower. In the 1952 table tennis doubles two English players with cervical lesions, Pratt and Taylor, playing with their paddles taped to their paralyzed hands, performed the extraordinary feat of sweeping all three classes.

"This," Dr. Guttmann says, "shows to what extent the remaining adjustment forces, even in such high spinal-cord lesions, can be mobilized by systematic training."

One of the most satisfying by-products of the Games has been the opportunity they offer for exchange of information on the treatment of paraplegia. This year for the third time a concurrent conference was held on special topics in this field, and once again Dr. Guttmann played host to several score specialists with the rattle of fencing steel and the thud of arrows in the background.

Apart from this, the Games themselves serve to show off the merits of new developments in technique and equipment. The American basketball entry, the Pan Am Jets, for instance, in the process of trouncing the British have taught them some valuable lessons — and not only in American-style basketball. When they first met the Americans, in 1955, the British used a clumsy, cushioned wheel-chair that was easily outmaneuvered by our light portable one. The Games demonstrated the advantages of the American model, and by last year the British too had adopted portable chairs. However, the Americans trounced them again. "We can now," a British observer remarked sadly after the match, "only put it down to a difference in the food."

In fact, the over-all winner this year was the U. S. The Stoke Mandeville Hospital team was second.

*Reprinted from Scope Weekly, Courtesy of The Upjohn Company, Kalamazoo, Mich.

Doctor — Are You a Member of the Flying Physicians Association, Inc.?

The Flying Physicians Association, Inc. was organized in June, 1955 to promote a spirit of fellowship within the medical profession for those who have a pilot's interest in aviation. The Association is incorporated under the laws of New York State as a non-profit, educational and scientific society. The objectives of the Association are:

To promote general aviation safety by example and teaching;

To attain more advanced proficiency and knowledge in the operation of aircraft;

To stimulate aviation consciousness and acceptance in young men and women;

To advance safe flying procedures;

To encourage aviation activity and consciousness within professional ranks, and

To cooperate with civilian agencies engaged in the welfare of our country.

Membership in FPA is open to all duly licensed physicians who are members of the American Medical Association and who hold valid pilot certificates. For detailed information write National Headquarters, Flying Physicians Association, Inc., P. O. Box 3275, Tulsa, Okla.

Addict's Chances to Break Habit Slim

Drug addicts do not suffer from their illness, they enjoy it, and therefore their chances of ever breaking the habit are slim.

This is the belief of Dr. Sandor Rado, clinical professor of psychiatry, Columbia University College of Physicians and Surgeons, who has been studying the mental makeup of addicts for 30 years, as reported in the *American Journal of Psychiatry*.

The pleasant effects of a narcotic drug strengthen a person's inner belief that he is all powerful, an idea that begins in infancy when a baby first realizes he can move. After that, the baby attributes unlimited power to his intentional actions and pictures himself as an omnipotent being.

This early belief is the hidden core of an addict's desired self and under the effects of a narcotic, he regains the early feelings of power.

Narcotics bring a sudden change from pain to pleasure and this proves to the addict that, after all, he is the omnipotent giant he always fundamentally thought he was.

Strangely enough, even the addict's guilty conscience helps to tighten his grip on the drug. To placate his conscience, he turns to self-punishment and his unconscious mind drives him to further self-destruction with the

drug. His conscious minds lets this happen because of the typical addict's belief that "Nothing can happen to me."

The mere withdrawal of the drug without other treatment is not enough to free the addict from his dependence on drugs. Available information shows that the majority of patients relapse within a few months and the rest within a few years.

Getting the addict off the drug has to be the first step in rehabilitation but the actual withdrawal is a precarious procedure. The ideal solution in the future may come from the biochemists who discover a way to immunize a person against the pleasure-producing effects of a narcotic.

Steps in this direction have recently been taken with the discovery, in animals, of the brain's pleasure-producing centers.

Make New and Better Drug From Old One

A better TB drug, longer acting and less toxic than the presently used isoniazid, is reported by scientists from the University of Melbourne, Australia, in *The American Review of Tuberculosis and Pulmonary Diseases.*

Named Verazide, the drug is derived from isoniazid by chemical treatment. It appears to be safe in man in doses up to four times those recommended for isoniazid, Doctors Sydney D. Rubbo, Janice Edgar and Geoffrey Vaughan of the University's school of bacteriology state.

Although isoniazid is probably the most effective drug now available against tuberculosis, it can cause neuritis in some TB patients. In neuritis, the nerve cells become damaged and cause pain sensations that vary from tingling to stabbing.

To prevent this, patients on isoniazid must often be given supplementary doses of vitamin B-6. Verazide is regarded as potentially superior to isoniazid since higher concentrations can be kept in the body without this side effect.

It appears to work against tuberculosis in the same way as isoniazid. Clinical trials have been started in Australia and South Korea.

Radio Wave Machine Promotes Faster Healing

An electronic medical device called the Bio-Cold-Ray that can heal burns, ulcers and poison ivy faster than any other method is reported by Dr. Daniel L. Seckinger, former director of Public Health, District of Columbia, in the *Medical Annals of the District of Columbia.*

The Bio-Cold-Ray generates radio waves at a frequency of 420 kpc, a little below the lowest frequencies used by commercial broadcasting stations.

The electrical energy is not the same as that from a short-wave diathermy machine, and seems to have some "unknown" attraction to tissues that results in faster healing. It does not heat the body internally as diathermy does.

One patient treated with the ray had been admitted to the hospital with advanced gangrene from frozen feet. Amputation was thought to be the only choice when the electronic treatments were started. Definite improvement was noticed after the fifth treatment. Within 30 days complete healing had occurred and the patient was released from the hospital as cured.

The Bio-Cold-Ray was also used on a severe case of poison ivy, and relieved the itching and soreness after the first treatment.

In use, the patient holds one electrode in his hand and places the affected part of his body between it and the machine. The Bio-Cold-Ray has been used on tissues as delicate as the eye without any noticeable increase in temperature, Dr. Seckinger reports.

Rehabilitation Services Coordinator Appointed

Because of Milwaukee's interest in coordinating the services for handicapped individuals who might have multiple problems requiring a variety of skilled services, Marquette University School of Medicine (Wisconsin), through the aid of a federal grant, has appointed Mrs. Alice H. Sanders to coordinate rehabilitation services. Mrs. Sanders formerly was secretary of the Milwaukee Community Welfare Council Health Division. The project will be directed by an executive committee made up of Dr. John S. Hirschboeck, Dean of the Medical School, as chairman, and representatives from the following agencies: Goodwill Industries, Curative Workshop of Milwaukee, Jewish Vocational Service, and the State Department of Vocational Rehabilitation. Plans for this project were developed by the Community Welfare Council of Milwaukee.

Dr. Harold Cook, Associate in Medicine at Marquette University School of Medicine, will act as medical consultant for the program. He will also coordinate the teaching of rehabilitation to medical students. Dr. Cook's work will be sponsored by a grant from the National Foundation for Infantile Paralysis.

Motion Picture Subjects for Postgraduate and Undergraduate Training, Nurses' Training, Community Education and Medical Public Relations

MEDICAL FILM-OF-THE-MONTH

for postgraduate and undergraduate training

(All films in color and sound, unless black-and-white is indicated.)

Pitfalls in Management of Refractory Heart Failure (35 minutes)

The Blood Vessel and Living Pathology (25 minutes)

Arterial Insufficiency of the Extremities (21 minutes)

Radioisotopes — Their Application to Humans (32 minutes)

The Atomic Apothecary: Radioisotope Research in Biology and Medicine (38 minutes, b & w)

The Hela Cell Strain: Cervical Carcinoma (11 minutes, b & w)

Cervicitis: Diagnosis, Etiology and Treatment (50 minutes)

Occupational Health Problems (48 minutes)

The Wisconsin Cleft Palate Story (35 minutes)

Treatment of Paranasal Sinusitis (15 minutes)

The Major Neuralgias (50 minutes)

Parkinson's Syndrome (54 minutes)

Diagnosis of Childhood Schizophrenia (36 minutes)

Hypnosis: A Psychiatric Tool (20 minutes)

Fractures of the Femur About the Hip (21 minutes)

The Busy Doctor vs. the Company Representative (18 minutes)

FILMS AVAILABLE THROUGH GRANTS FOR INSTRUCTION

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Peripheral Vascular Disease — A New Therapeutic Agent (30 minutes)

Ano-Rectal Sigmoidoscopic Examination (35 minutes)

Ano-Rectal Applied Anatomy (22 minutes)

The Treatment of Deafness by Prosthesis (35 minutes)

The Inner Ear (35 minutes)

Clinic on Deafness (33 minutes)

Function of the Ear in Health and Disease (35 minutes)

Otitis Media in Pediatrics (35 minutes)

Chronic Purulent Otitis Media (47 minutes)

An Otological Seminar (35 minutes)

Otoscopy in the Inflammations (35 minutes)

Sigmoid Sinus Thrombosis (35 minutes)

A Clinic on Acute Mastoiditis (40 minutes)

Ocular Bacteriology — Its Application to Clinical Practice (30 minutes)

Ocular Biomicroscopy — Technique and Interpretation (46 minutes)

Petrositis With Meningitis (30 minutes)

Anatomy of the Ear (35 minutes)

Arterial Blood Pressure (35 minutes)

NURSES' TRAINING FILMS-OF-THE MONTH

all black-and-white

Care of the Cardiac Patient (33 minutes)

Care of the Patient With Diabetes Mellitus: Uncomplicated (29 minutes)

Care of the Patient With Diabetes Mellitus: Complicated (23 minutes)

Care of the Newborn Baby: the Nurse's Role in Instructing Parents (31 minutes)

Recreational and Occupational Therapy (13 minutes)

Feeding the Patient (15 minutes)

Interrelation of Vital Signs: Body Temperature, Pulse, Respiration, Blood Pressure (32 minutes)

Therapeutic Uses of Heat and Cold: Hot Applications (21 minutes)

Therapeutic Uses of Heat and Cold: Cold Applications (22 minutes)

Hydrotherapy (22 minutes)

Bathing the Patient (24 minutes)

Fundamentals of Massage (12 minutes)

FILMS FOR THE LAITY

to be announced shortly

A Medical Film Guild library of motion picture subjects, issued in "Film-Of-The-Month" form and available to local medical groups and individual doctors for use in furthering community education and public relations programs, is now being compiled, and will be announced to the profession in several weeks. Films will be offered in three categories: theatrical — dramatizations of vital medical subjects; semi-theatrical — dramatic documentary subjects, and non-theatrical — clinical documentary subjects.

For rental charges and further information, contact Joseph P. Hackel, President, Medical Film Guild, Ltd., 506 W. 57th St., New York City 19.

"Sludge" May Cause Deafness

"Sludge" in the blood may be responsible for some cases of deafness, Dr. Edmund Prince Fowler, a New York ear specialist, reports in the *Archives of Otolaryngology*.

The sludge was revealed after examination of the eye's blood vessels, and consisted of clumps of red blood cells. These circulate in the blood during illnesses, after severe injuries, in old age and after emotional upsets.

The sludging was found in various types of sudden and progressive deafness, including Meniere's disease, a condition characterized by head noises and dizziness, and otosclerosis, a degenerative disease of the ear.

Emotions and sludging appeared to be related, he added, since most patients with otosclerosis who also showed the sludging had histories of unresolved frustrations and abuses.

During attacks of head noises or dizziness, sludging of the blood regularly occurs. It is also found after the sudden onset of deafness and strongly suggests the sudden deafness is caused by oxygen shortage in the ear's labyrinth due to blocking of the circulation.

Preparation for Aging Must Begin Early

Preparation for aging should begin in the "prime of life," a 72-year-old North Carolina physician stated.

Dr. Wingate M. Johnson of Winston-Salem, a member of the committee and a professor at Bowman-Gray School of Medicine, listed seven rules of conduct he devised for himself some years ago. These rules have helped some of his patients and friends grow old with a "reasonable degree of complacency," he said. They are:

1. Recognize that the mind should be at its best when a person is about 40 years old and should continue to be efficient to the age of 70 or more. Organic changes in the brain do not necessarily parallel mental changes. The mind which is properly trained does not lose its elasticity, and constant use of the brain helps to keep it efficient.

2. Avoid becoming an "old fogy" by frequent association with young people. Prepare for occasional shocks, but try to understand youth's view-point.

3. Learn to delegate authority and to unload responsibility upon younger, more enthusiastic shoulders.

4. Cultivate wide interest. Learn new uses for hands and brain, and exchange more strenuous amusements for others less arduous.

5. Keep in touch with old friends and make new ones to avoid loneliness.

6. Cultivate equanimity — the mental poise that keeps one from being unduly elated or depressed. Keep a proper balance between emotion and reason.

7. Cultivate the habit of looking forward rather than backward.

Brain Defects Shown by X-Rays of Pelvis

Suspected cases of mongoloidism in infants can be confirmed by x-rays of the pelvis, even before the infant has grown enough to show any outward signs of the defect. This was reported by Dr. John Caffey, Columbia Presbyterian Medical Center, New York, to the American Roentgen Ray Society meeting in Washington.

The entire mongoloid pelvis is smaller than the normal pelvis and the difference between the two is most noticeable in infancy.

Mongoloidism is a severe form of mental deficiency for which there is no cure. It gets its name from the fact that mongoloids have flattened skulls and slanted eyes, somewhat resembling those of the Mongolian people.

The x-ray is important so that children with a similar appearing condition at birth, but who are not mongoloid, can be helped back to normal health with remedial treatment.

Dr. Caffey has made careful measurements from x-ray pictures and set up "normal" and "mongoloid" dimensions as a guide to doctors who are faced with the problem of deciding whether or not an infant is mongoloid.

AEC Supporting International Topical Conferences

In order to help speed up the peaceful uses of nuclear energy throughout the world, the Atomic Energy Commission is participating in and supporting conferences which bring together in the United States groups of leading scientists from friendly nations for topical discussions on specialized atomic energy subjects.

This is the Atomic Energy Commission's response to a need, expressed by many scientists, for an opportunity to discuss the many unclassified problems and developments in atomic energy which cannot be taken up in the broad Geneva-type conference.

Not only will American scientists benefit from the exchange of ideas on scientific advances, but it is hoped that these discussions will do much to lower the barriers which impede the interchange of information among friendly powers.

These conferences generally will be sponsored by private institutions in this country. They will cover various aspects of physics, chemistry, biology, medicine, and other sciences relating to nuclear energy.

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abstracts

Lesions in the White Matter in Acute Poliomyelitis. Irwin Feigin. Neurology 7:6 (June) 1957.

The author describes lesions in the white matter of the spinal cord in four cases of fatal acute poliomyelitis. The most frequent pathologic change is the occurrence of perivascular lymphocytic infiltration. In the two cases of shortest duration, approximately one and three weeks respectively, focal areas of acute inflammation were noted with infiltration by a few polymorphonuclear cells and a more marked proliferation of microglial phagocytes. In some of these areas the blood vessel wall was involved. In one case there was actual necrosis in the wall. In another there was capillary thrombosis. The lesions were more often present near the leptomeningeal surface although sometimes adjacent to the involved gray matter.

In cases of longer duration about four and five weeks respectively, larger lesions of a different character were observed. These consisted of an area of marked rarefaction with a severe loss of axons and myelin sheaths. There was a negligible astrocytic and a moderate microglial response. Inflammatory cell infiltration was minimal. The author feels that sensory changes in acute poliomyelitis have been neglected and that these changes may be related to the observed lesions. However, since there is no information as to how soon after death the spinal cord was examined, the possibility that these lesions may be postmortem artefacts must be entertained.

Changes in the Therapy of Fractures of the Head of the Humerus. G. Ostapowicz, and R. Koch. Arch. klin Chir. 285:38-53 (No. 1) 1957 (In German) [Berlin].

Of 490 patients with fractures of the head of the humerus treated between 1945 and 1954, 106 were hospitalized. During the first five years of this decade, immobilization bandages were used most frequently with the aid of an abduction splint or abduction casts. Immobilization of well-impacted fractures or fractures with slight dislocation was carried out for approximately four weeks with Desault's bandage. Extension splints were used for complicated fractures; the humeral triangle was used in only two patients. In the second five years a functional method of treatment was first practiced for impacted fractures and for those with moderate dislocation when the fracture surfaces were still in contact. Later, the indications were extended, and the method was used also for fractures with extensive dislocation. This method consists of early resumption of the active function of the fractured arm. The fractured extremity is immobilized with the aid of Desault's bandage for seven days only, and, on the eighth day, active movements of the shoulder joint are resumed.

Reduction was carried out in 51 fractures between 1945 and 1949 and in 16 fractures between 1950 and 1954. Open reduction was performed in only one patient, since the introduction of the functional method of treatment, as compared to 8 patients who were so treated before the introduction of the functional treatment. Of the 8 patients, treatment consisted of wire loops in two, nailing in four, removal of the head of the humerus in one, and transplantation of a tibial graft in one. The average duration of treatment in patients who were given functional therapy was 67.7 days, while it was 105.9 days in those treated by immobilization. Follow-up examinations were carried out in 75 patients in an attempt to determine the permanent results of treatment. Of 22 patients treated by immobilization, 13 (55%) had obtained free mobility, while 43 (80%) of the 53 patients treated by the functional method had obtained free mobility.

Treatment of Paralysis with Exponentially Progressive Currents. Harold Thom. Brit. J. Phys. Med. 20:49 (Mar.) 1957.

The objectives of electrotherapy in the treatment of peripheral nerve injuries are reviewed. Electrotherapy by means of the conventional faradic and rectangular current is discussed. A new concept of electrical stimulation in denervated muscle is proposed. The author compares the time-intensity curves for normal muscle, sensory nerve, and denervated muscles. There is an area on the curve for denervated muscle which does not overlap the curves for normal muscles and sensory nerves. It is then postulated that a long triangular impulse which is exponentially progressive in time and intensity will selectively stimulate denervated muscles. The selective stimulation will avoid overflow of

current to normal muscles and irritation of sensory nerves. The impulse duration should be as short as possible but long enough to be effective. The impulse gradient should be adjusted to achieve maximal selectivity. The duration of pauses between stimuli should not fall below a minimum which might cause premature fatigue of the muscle. The current intensity should be sufficient to achieve a strong contraction in the treated muscle. It should not result in overflow or pain. The author believes that the bipolar technic of stimulation is important in using the long triangular impulse. The therapeutic applications of electrotherapy are also discussed.

Some Problems of Hand Surgery. H. Kelikian, and A. Dounamian. Surg. Clin. North America **37**:3 (Feb.) 1957.

A rather heterogenous group of problems related to the hand is discussed. Illustration for each with some of the important anatomic considerations and principles of treatment are given. The importance of a planned, coordinated approach in the treatment of this complex structure is emphasized, where skin grafts, tendon transfers, digital shifts, osteotomies, capsulotomies, arthroplasties and amputations overlap.

In compound injury seen after several days, the authors advocate a week or two of supportive treatment to allow subsidence of infection and edema before definitive therapy. They suggest excision of the metacarpal head in pyogenic arthritis of the metacarpophalangeal joint with destruction of the articular surface of the metacarpal. Good results from this procedure were reported. The functional deficit of abduction of the index finger and flexion of its metacarpophalangeal joint in tear of the first dorsal interosseous muscle is described, and excellent results reported by suturing the tear.

The proper level of amputation of the metacarpals is described considering the cosmetic and functional results. The relationship of the second and third metacarpals to the adductor pallicis is demonstrated. The proximal two-thirds of the second metacarpal, which acts as a fulcrum, and the proximal three-fourths of the third metacarpal, on which is the origin of the muscle must be preserved.

The problem of the amputated thumb is discussed with reference to treatment by deepening of the interdigital web, and pollicization of the index finger. The anatomic relationships of this area of the hand are well described, with a brief description of the surgical technics. Emphasis is placed upon the preservation of the nerve and vascular supply to the index finger.

The pathology of Dupuytren's contracture is briefly described. Among the many treatments which have been advocated, the authors favor exposure of the fibrous mass through an adequate incision and its careful excision.

Tendon replacement with grafts is advocated in preference to attempt primary suture of the profundus and sublimis tendons when injured within their common sheaths in the fingers. Under the heading of "sundry other problems," Bennett's fracture, flexor carpi radialis transplant for thumb extension and abduction in radial nerve injuries, and the futility of bone grafting for phalangeal defects are discussed. This paper is permeated with common sense in treatment of some of the more difficult problems of hand surgery.

Cultivation of Spirochaetes from Spinal Fluids of Multiple Sclerosis Cases and Negative Controls. Rose R. Ichelson. Proc. Soc. Exper. Biol. & Med. **95**:57 (May) 1957.

The spinal fluids from 76 patients with clinically diagnosed multiple sclerosis and from 28 control individuals were cultured under anaerobic conditions on a special culture medium. Smears of the cultures of all the spinal fluids were stained by the silver nitrate-tannin technic and examined by phase and dark field microscopy. Fifty-nine (78%) of the multiple sclerosis smears revealed micro-organisms varying from 10 to 22 microns in length, and about one micron in thickness. They were actively motile and characterized by wide spirals. All smears from the control group were negative for spirochaetes.

Studies of the Pharynx: II. Poliomyelitis Disabilities of the Lower Pharynx. James F. Bosma. Pediatrics **19**:1053 (June) 1957.

This is a second of a series of reports on studies of the structure and movements of the pharynx in normal subjects and in patients with post-poliomyelitis disabilities.

Descriptions of function and disturbances of speech and swallowing are quite detailed. Evidence is presented to show that the hypopharyngeal sphincter opens by muscular action of the pharyngeal muscles and muscles which elevate the hyoid-larynx complex to receive a bolus of food or liquid. It is not forced open by peristaltic force or by air pressures up to 40 to 60 millimeters of mercury in the pharynx above the sphincter. It appears also that the cricopharyngeus muscle, formerly thought to close the hypopharynx on contraction and to be relaxed when the hypopharyngeal sphincter opens, elevates the hypopharynx and assists in opening the sphincter.

The necessity of elevating the hyoid-laryngeal column and the pharynx in preparation for swallowing leads patients to tilt the head in a direction opposite to the side of the weakness since this apparently assists in elevating the pharynx on the side of the weakness. It would appear that weakness of the pharyngeal constrictors results in much less functional disability than weakness of the levators of the hyoid-larynx column.

In these reports the author frequently presents evidence of function and disability which is contradictory to previously held opinions regarding this area. In each instance he gives careful descriptions and illustrations to substantiate the statement.

Barium Swallow Examination in Myasthenia Gravis. J. Wyn Edwards, and J. P. Murray. Brit. J. Radiol. **30**:263 (May) 1957.

Radiologic observations of barium swallow in eight patients known to have myasthenia gravis with histories of difficulty in deglutition are presented. By withholding neostigmin or "Mestinon" for as long a period as possible, Edwards and Murray demonstrated hesitation in initiating deglutition and clearing of barium paste from mouth and pharynx. Following parenteral neostigmin in four cases and oral neostigmin in two, measurable improvement was noted. "Tensilon" was not noted to give measurable improvement after intravenous administration, probably because its brief period of action is easily missed in such studies.

The authors believe the measurable changes shown by this method are equally as good a measure as muscle strength testing in the extremities and that it is not subject to the variation due to voluntary control of peripheral musculature in the course of examination.

Swallowing time of the subjects before administration varied between fifteen seconds and greater than three minutes. Fifteen minutes to three and one-half hours following medication, times varied between seven seconds and one minute. The control subjects completed swallowing in less than three seconds.

The Normal Pulmonary Arterial Pressure During the First Year of Life. Richard D. Rowe, and L. S. James. J. Pediat. **51**:1 (July) 1957.

Fifteen infants under one year of age free of intracardiac defects were studied by catheterization of the main pulmonary artery while breathing air. Nine infants over eleven days of age showed pulmonary artery pressures within the so-called "adult" range. Six infants under the age of twelve days showed considerably higher pulmonary arterial pressure. In four of these there was indirect evidence of a patent ductus arteriosus. Direct evidence by catheterization was obtained in one instance and by angiocardiography in another. The authors state that in none of these fifteen cases was a continuous murmur audible at the time of study.

It is concluded that, contrary to previous belief, the decline in pulmonary arterial pressure which occurs in infancy takes place somewhere within the first two weeks of life. The factors, in order of importance, are (1) ventilation of the lungs; (2) changes in the ratio of lumen size to wall thickness of the small pulmonary muscular arteries, and (3) closure of the ductus arteriosus.

Drug Therapy for Hypertensive Vascular Disease in Patients Past Midlife. R. W. Wilkins. Geriatrics **12**:311 (May) 1957.

A well-established diagnosis of hypertension and a thorough investigation of all possible causes should be carried out before drug therapy is considered; also reassurance and moderate weight reduction should be carried out before medications are used. Wilkins states "I believe there are only three classes of drugs that should be used in the elderly unless and until it has been proved that these will not work. In order of their strength and ease of use, they are Rauwolfia, Veratrum, and occasionally Apresoline." Treatment should begin with low dosages of a Rauwolfia type drug. On the average this drug reduces the mean blood pressure about 20 mm. Hg. A drug from the Veratrum class may be added to the Rauwolfia if control is not adequate on the single drug. If a patient has severe disease and has not responded to the first two drugs, then Apresoline may be cautiously added to the other two drugs.

Studies of the Pharynx: III. Occlusion of the Mesopharynx Resulting from Bulbar and Cervical Spinal Poliomyelitis. W. H. Merrit; M. Nielson; J. F. Bosma; W. A. Goates; R. Haskins; C. Ramsell, and R. H. Lamb. Pediatrics **19**:1080 (June) 1957.

This is the third of a series of studies of patients with disabilities following bulbar poliomyelitis. Two patients demonstrated continued occlusion of the mesopharynx resulting in total disability of speech and swallowing. Using the methods described in the two previous reports, the authors concluded this disability resulted from a combination of factors. Namely, cervical lordosis with an

abnormally acute cranio-vertebral angle secondary to severe weakness of cervical musculature, and abnormal elevation of the hyoid structures reflecting weakness of the sterno-hyoid and sterno-thyroid muscles. There is a short description of the orthopedic measures, speech and physical therapy used in correcting the disabilities.

On the basis of these and other studies, the authors make recommendations for the management and therapy of patients with bulbar poliomyelitis. The authors implicate the use of rolled towels, etc., as support of the mid-cervical region during the acute and convalescent phases of poliomyelitis as a major cause of the lordosis. They recommend constant attention to head position, including orthopedic support when the patient is erect, and continuing use of oral and pharyngeal structures while the tracheotomy is in place to prevent development of contractures and subsequent failure to regain speech and swallowing in such patients.

Impairment of Manual Dexterity in the Cold. J. S. LeBlanc. J. Appl. Physiol. **9**:62 (July) 1956.

Eight healthy young men were given two simple tests of finger dexterity of 10 seconds duration at intervals of one minute for 10 to 15 minutes after exposure to cold. Test A involved movement of the index finger around a baffle to give maximal flexion of the proximal interphalangeal joint. Test B was simple tapping involving a fifteen degree flexion of the joint.

After the arm (hand excluded) was cooled in ice water for 10 minutes there was a 20 per cent drop in finger dexterity in both tests in spite of only a slight decrease in hand, finger-tip, and knuckle temperature. After the hand alone was cooled for 10 minutes there was a 20 per cent drop in dexterity in test A and an eight per cent drop in test B. After the index finger alone was cooled for five minutes there was a 20 per cent drop in test A but no significant change in test B. In experiment 4 the arm was cooled for a longer (unspecified) period than 10 minutes and the hand was kept in water at 33 C. There was a 50 per cent drop in dexterity in both tests.

From these experiments the author concludes that increased viscosity of the synovial fluid is not the only factor affecting finger dexterity. Cooling the arm caused a decrease in dexterity probably on the basis of arm muscle impairment. Cooling the hand impaired the function of the intrinsic musculature which enhanced the effect of increased viscosity of synovial fluid in the finger joints.

Electromyography and Electric Stimulation of Nerves in Diseases of Motor Unit: Observations on Myasthenic Syndrome Associated with Malignant Tumor. Lee M. Eaton, and Edward H. Lambert. J.A.M.A. **163**:1117 (Mar. 30) 1957.

The authors point out how the recording of electric potentials in voluntary muscle at rest and during activity can be used effectively in the diagnosis and study of neuromuscular diseases. The value of electromyography and electrical stimulation is generally assessed and also illustrated by specific examples. A case of carpal tunnel syndrome and several cases of a myasthenic syndrome associated with malignant tumors are discussed.

The myasthenic syndrome is characterized by undue weakness and fatigability of muscles; decreased or absent stretch reflexes; a relatively poor response to test doses of neostigmine when compared to the response observed in a case of myasthenia gravis of comparable duration and severity; marked sensitivity to test doses of curare; and temporary increase in strength of weakened muscles in response to voluntary exercise of a few seconds' duration. The electromyogram reveals motor unit action potentials of the myopathic type with frequent variations in amplitude from moment to moment. There is a greatly reduced twitch and action potential of the muscle on a single maximal stimulus to its nerve. Transient further depression of the response with repetitive stimulation at rates of one to 10 per second is observed, with marked facilitation of the response during stimulation at higher rates. There is also marked facilitation of the response to stimulation for several seconds after a voluntary contraction. Conduction velocities of motor axons are normal.

Diagnosis, Treatment, and Prevention of Chronic Hypercortisonism in Patients with Rheumatoid Arthritis. C. H. Slocumb; H. F. Polley; L. E. Ward, and P. S. Hench. Ann. Int. Med. **46**:86 (Jan.) 1957.

Excessive dosages of cortisone, corticotropin, and related adrenocortical hormonal preparations may cause acute hypercortisonism or chronic hypercortisonism. Chronic hypercortisonism is characterized by cyclic swings of mood and symptoms. "Increased fatigability, muscular and joint aching, and emotional instability alternate with stimulation associated with a restless drive and relatively little aching." Diffuse mesenchymal reactions similar to periarteritis nodosa and lupus erythematosus may develop. It may be quite difficult to differentiate musculoskeletal symptoms of hypercortisonism from those of a flare of rheumatoid arthritis. Treatment of chronic hypercortisonism consists mainly of

giving the patient extra rest and gradually decreasing the hormone dosage. Prevention of hypercortisonism is important. Daily maximally tolerated doses for long-term hormonal therapy in rheumatoid arthritis is estimated for adult men as 37.5 to 50 mg. cortisone and 6.5 to 9 mg. prednisone.

Choice of Therapy for Peripheral Arteriosclerosis. E. A. Edwards. New England J. Med. **256**:875 (May 9) 1957.

Surgical procedures of endarterectomy or graft replacement may be indicated in patients with localized arteriosclerotic change but are not indicated in patients with generalized arteriosclerotic changes. The following procedures may be of assistance in determining whether the process is localized or generalized: location of claudication pain, oscillometry of the pulses, auscultation of the major arteries, and arteriography. The indications and limitations for the use of sympathectomy and arterial reconstruction are discussed. "At present, aneurysm stands out as the only certain indication for graft replacement." Conservative management including skin grafting and sympathectomy is often successful in treatment of necrotic areas of the extremities. Whether this success means healing of the skin lesions or development of a useful extremity is not stated.

Comparison of Effects of Static and Dynamic Work on Blood Pressure and Heart Rate. W. W. Tuttle, and S. M. Howorth. J. Appl. Physiol. **10**:294 (Mar.) 1957.

Changes in blood pressure and pulse rate were recorded while subjects carried out either dynamic or static work over a period of one minute. Static work consisted of maximal effort squeezing of a hand dynamometer while dynamic work was carried out on a bicycle ergometer.

Alterations in arterial blood pressures as a consequence of dynamic work were similar to those reported by many workers. As a result of static work an increase in the diastolic pressure was also noted with a mean increase at the end of 45 seconds of work of 44 mm. Hg.

The authors postulate that the response noted during static work is probably due to reflexes arising from active muscle which are altered during dynamic work by superimposed vasodilatation.

Because of the difference in the amount of work done by two different parts of the body, the results and conclusions must be interpreted with some reservation.

Physical Measures in the Aged. D. L. Rose, and W. S. Alyea. J.A.M.A. **162**:1524 (Dec. 22) 1956.

The physiological problems encountered in the rehabilitation of the aged were reviewed briefly. Rose and Alyea are of the opinion that a major complication in the handling of the elderly patient is hypoxia. Studies on vital capacity indicated that none of the elderly patients studied had a vital capacity greater than 70 per cent of the normal. The majority had vital capacities of less than 50 per cent of normal. The reduced respiratory function was the result of atony or rigidity of the abdominal and diaphragmatic musculature, bronchial obstruction, or pre-existing pulmonary disease. Specific breathing exercises were utilized to combat atony or spasticity of the respiratory muscles. Intermittent positive-pressure breathing and bronchodilator drugs were used to improve respiration in cases of chronic emphysema. An exsufflator was applied to the patients who had difficulty eliminating accumulated bronchial secretion.

All the patients increased their vital capacities. Some improved so rapidly that disuse was considered to be a factor in the reduced pulmonary function. It was also noted that there was greater emotional stability and the psychological outlook improved in most instances. The authors stressed the importance of early ambulation of the aged individual to help restore proprioceptive motor patterns and to improve respiratory exchange.

A Pathologic Review of Degenerative Shoulder Lesions. J. S. Neviasen, and S. H. Eisenberg. Bull. Hosp. Joint Dis. **17**:297 (Oct.) 1956.

In 1934 Codman first published his work on the investigation of the non-traumatic painful shoulder. His opinion was that the changes in the subacromial bursa were secondary. Recently the onus of blame has been placed on the capsule and musculotendinous cuff. In the past decade the etiological responsibility has been shifted frequently to the biceps tendon, the capsule, or the so-called "periarthritic personality." This paper attempts to clarify the developmental etiology of the painful shoulder by means of pathological studies of sections from surgical and necropsy specimens.

The joint capsule and the musculotendinous cuff are the chief elements responsible for stability of the shoulder joint. The capsule is intimately associated with the tendons of the external rotators as well as those of the internal rotators. This fusion is frequently referred to as the musculotendinous cuff.

The most common degenerative lesion found in the shoulder is the so-called calcific tendinitis, which is most often seen in supraspina-

tous tendon. The tendons are swollen and it is the effort of forcing this tender swollen mass under the relatively fixed coraco-acromial arch that causes the maximum pain when the arm is abducted from 80 to 120 degrees. The pathologic picture shows the swollen cells in the fibrous tissue, vascular hyperplasia, and perivascular round cell proliferation. The subacromial bursa shows secondary involvement due to irritation from the swollen tendons and their calcified deposits. Usually the irritative processes in the bursa subside and with the absorption of fluid the symptoms are relieved. A less frequent course is rupture of the calcific material into the bursa. Even though the agonizing pain may be relieved, the patient is left with an aching shoulder and he voluntarily restricts his shoulder activity. Ultimately adhesive capsulitis and thickening of the bursal walls may develop. Immobility of the shoulder is the common denominator in the development of this lesion. Patients having adhesive capsulitis who were subjected to surgery were found to have an absence of joint fluid and adhesions of the capsule to the humeral head. Some investigators have held that biceps tendinitis was solely responsible for the clinical manifestations of an adhesive capsulitis. Clinical studies, surgical observation, and pathological evidence have led these authors to disagree with this concept. They found that the capsular pathology reduced the mobility of the biceps tendon and caused a fixation of the tendon in the groove. The tendinitis was therefore believed to be a result of the capsular pathology rather than its cause.

There was no evidence in this study to justify the assumption that a capsulitis is limited to those individuals having a specific personality. The authors believe that the inability to use the affected extremity was the cause of the so-called periarthritic personality rather than the periarthritic personality the cause of the adhesive capsulitis.

Long Term Results of Orthopaedic Surgery in Cerebral Palsy. W. M. Phelps. J. Bone & Joint Surg. **39-A**:53 (Jan.) 1957.

The author reports on 242 patients with cerebral palsy who underwent various orthopedic procedures to correct deformity or to reduce disability. The postoperative followup periods ranged from 5 to 43 years. The end results were evaluated from two points of view: (1) Did the surgery improve the total physical condition? (2) Did the procedure correct the local deformity or disability?

Fifteen per cent of all procedures performed on patients under 14 years of age were successful. Forty per cent of the operations performed on patients over 14 resulted in improvement. The author believes that surgery on muscles or tendons in the younger age groups was unsuccessful because of the growth factor. Neurectomies were generally unsatisfactory because the nerves regenerated. Transplantation of tendons in spastic and athetoid patients usually failed. This is believed to be due to the fact that the lesions in cerebral palsy are either upper motor neuron or extra pyramidal and muscle groups rather than individual muscles are involved. External fixation by braces should be used to determine the effect of future bony surgery in the athetoid patient. The danger of athetoid shift following surgery can thus be diminished. Osteotomies and arthrodesis resulted in improvement in 90 per cent of the patients. Tenotomies of the adductors and hamstrings were found to be the most valuable non-osseous surgical procedure on adults. Although the orthopedic surgery in this series was performed between 1902 and 1950, no data are given to indicate whether or not improvement of surgical technics over this period may have affected the statistics.

Description and Management of Paraosteoarthropathy in the Hemiplegic Patient. L. J. Cordrey. J. Chron. Dis. **6**:600 (Dec.) 1956.

An uncommon complication of any neurologic disease producing paralysis and loss of sensation in the lower extremities is extra-articular ankylosis of the joints or paraosteoarthropathy. This condition occurs most commonly in the hip joint and has been loosely attributed to myositis ossificans. The author believes that the ossification is primarily in the capsule of the hip joint rather than in the surrounding muscle. The cause of this condition seems to be low grade trauma to a paretic hip joint with tearing of the unprotected capsule. The subsequent hemorrhage and degeneration is followed by calcification and ossification. In these patients calcium, phosphorus and alkaline phosphotase values are normal and the serum protein is at the lower limits of normal. In the x-ray the joint space and normal outline of the femoral head are preserved, the abnormality being an irregular ossifying process of the joint capsule. The problem that this creates is not instability but ankylosis in malposition.

This condition was found in six of 103 hemiplegics, in three of 28 paraplegics, and in one of 36 multiple sclerotic patients in a 750-bed chronic disease hospital. All patients studied had contractures in flexion and external rotation of the hip. Where ambulation was considered possible this deformity was successfully corrected by subtrochanteric osteotomy and fixati on with a Smith-Peterson nail and Thornton plate. On the x-ray and at surgery no evidence of calcific deposits in muscle was found.

It is emphasized that proper splinting of the involved extremity and gentile passive exercises of the paralyzed limb will probably prevent this complication.

Hypercalciuria Following Poliomyelitis. Marcelle F. Dunning, and Fred Plum. A.M.A. Arch. Int. Med. **99**:716 (May) 1957.

The urinary excretion levels of calcium, phosphorous, and creatinine were studied in 54 male and female patients including adults and children. Each of the patients was studied in the acute or chronic stage of poliomyelitis and the severity of the paralysis varied from complete quadriplegia to lesser affected bulbar cases. The time in which the studies were made varied from one to 12 months after the onset of the disease. All patients received medical and physical rehabilitative treatment during this period of study. Daily calcium intake was restricted up to 500 milligrams per day.

Hypercalciuria was found consistently in all cases of acute paralytic poliomyelitis despite the fact that some patients were active within a few days after the onset of their illness. In the early stages of the disease the initiation and intensity of the hypercalciuria bore little relationship to the site or the degree of paralysis. In the bulbar or paralysis of the upper extremity excretion of urinary calcium approached normal levels within 14 weeks after the onset, while the paraplegic and quadriplegic patients had sustained hypercalciuria for six to twelve months after the onset of the illness. The duration of the hypercalciuria appeared directly related to the extent and degree of paralysis. In general, the earlier that walking was started, the greater was the tendency for hypercalciuria to persist beyond the date of full ambulation. No tendency was noted for phosphorous excretion to be maximal at time of maximal calciuria, nor did phosphorous excretion fall coincidently with the return of urinary calcium to normal. The intensity of phosphaturia in the present study bore no relationship to the extent of clinically estimated damage to the nervous system.

Theories as to underlying mechanisms of hypercalciuria were presented. Although bony atrophy consistently follows segmental denervation, peripheral efferent neural influences appear to affect metabolism of bone only indirectly to the neural control of muscle. Locally denervated extremities demineralize no more rapidly than do those placed in casts. It is doubtful that peripheral autonomic neural chances are responsible for inducing demineralization after polio since clinical evidence is against this hypothesis. The time honored theory that demineralization after paralysis results from a loss of mechanical stresses and strains on bone consequent to immobilization is somewhat blunted in these studies. If pure mechanical effects are responsible for hypercalciuria, it is surprising that the response is delayed up to seven weeks after immobilization. Also the ineffectiveness of tilting, the appearance of hypercalciuria in the mild bulbar poliomyelitis and increased calcium excretion after activity raises serious doubts as to this being the complete explanation for hypercalciuria. The evidence suggests that demineralization after poliomyelitis is initiated and maintained by systemic factors as yet only partially clarified. These factors appear at least to supplement any loss of stress and strain on bones resulting from immobilization.

Protein and Amino Acid Needs of the Aged in Health and Convalescence. A. A. Albanese; R. A. Higgons; L. A. Orto, and D. N. Zavattaro. Geriatrics **12**:465 (Aug.) 1957.

A five-year study of 20 healthy women with a median age of 79 years revealed that with few exceptions good nutritional status could be maintained on a protein intake of 54±5 gm. of which 39 per cent is derived from meat. The average energy value of the diet was 1560 calories.

However, during convalescence from any cause 39 elderly women consumed 64 to 98 gm. of protein daily in diets providing 1935 to 3484 calories. Meat proteins comprised 27 per cent of the total dietary protein. In spite of the relatively high food consumption 50 per cent of the patients remained in negative nitrogen balance. Addition of 600 to 900 mg. of lysine to the diet improved nitrogen balance significantly in 60 per cent of the patients.

It is concluded that lysine supplementation of the diets of elderly patients under nutritional stress enhances the biologic value of the diet, especially when meat proteins are scarce. They recommend consumption of 1.5 gm. of protein per kilogram of body weight per day with 30 per cent of the protein in the form of meat. The shortcomings of nitrogen balance studies are discussed and the danger of interpreting nutritional status from serum protein data is pointed out.

A Review of the Role of Physiotherapy in Ante-natal Care. G. J. Gartland. Brit. J. Phys. Med. **20**:1 (Jan.) 1957.

The author reviewed the literature to show that scientific evidence is lacking to indicate that ante-natal exercises are of any value to the expectant mother. These exercises are

being used extensively in Great Britain and being given in organized classes, but in spite of persuasion, only three per cent of multiparae register. It is believed this is good evidence that such exercises and classes are unnecessary. Such classes may have some value psychologically but probably only in the primiparae as a part of general education for labor. Workers have shown that anxiety and emotional factors have no bearing on uterine function during labor. Although the exercises will help in postural problems, there is no evidence that the length of labor nor the puerperium are materially affected regardless of whether the strength of the voluntary muscles (abdominal and pelvic floor) are good or not. A paraplegic may have a perfectly normal labor.

The practice of relaxation exercises would seem to be of value but unfortunately statistical analyses have shown that there is no appreciable difference in the length of labor, or its complications, between control groups and those groups that had practiced relaxation.

The author believes that mental preparation for labor is the function of the midwife or obstetrician and not the physical therapist. Large ante-natal classes with little individual attention do little to develop a good relationship between the patient and her attendant, and close rapport cannot exist between a patient and a physical therapist in an obstetrical ward.

Criteria that have been used to study effects of exercise are: length of labor; amounts of sedation used, and subjective phenomena such as the mother's psychological reaction to ante-natal training and her cooperation. The author believes that these alone are not sufficient; furthermore, a more standard technic of exercise would make obstetric investigations simpler.

Present Status of Ultrasound in Medicine. Fritz Friedland. J.A.M.A. **163**:799 (Mar.) 1957.

The author presents a sobering review of ultrasound, its use in medicine, its worth as a therapeutic tool and diagnostic aid, and its limitations and its advantages in clinical medicine. Although not all of the voluminous literature on the subject is covered, the article reviews those articles which can be considered pertinent.

The physics of ultrasound is well covered. Thermal effects of ultrasound are emphasized and the biological or mechanical effect of sonation is presented. The latter effect is presented as the destructive one, with resulting cavitation or pseudocavitation in sonated materials. In the author's opinion the thermal effect is dominant and the mechanical effect is of minor importance unless it becomes dangerous to the recipient of the ultrasound.

Three technics of application are described: the stationary, (that of holding the soundhead); slightly moving the soundhead, and the moving more rapidly (or massaging) with the soundhead. No mention is made of the newer "pulsating U. S. method." Advantages and disadvantages are listed for each method of application. No "standard dose" of sonation was given. The author does not dispute the fact that ultrasound is a valuable therapeutic device but he does not believe that sonation is any more advantageous than some of the other known physical therapeutic agents.

Indications and contraindications for use of ultrasound are briefly discussed. The laboratory evidences of the destructive effects of ultrasound are reviewed. The outstanding experimental status is that of using an echogram technic for finding tumors, foreign bodies, etc. in soft tissue. This shows much promise for the diagnostic use of ultrasound.

Current Concepts of Osteoporosis. Paul D. Redleaf. Minnesota Med. **40**:165 (Mar.) 1957.

This paper is presented as a general review of osteoporosis including the etiology, diagnosis, clinical features and therapeutic measures available for management of the problem. Much of the basic format for discussion is patterned after the work of Albright and Reifenstein. Familiar clinical patterns are reviewed with both subjective and objective symptoms carefully correlated. Of interest is the current belief that osteoporosis is a disease of tissue rather than calcium metabolism. Studies of Albright have shown that serum phosphorous may be elevated and that during a successful response to treatment this may drop to normal. Likewise, an elevation of the alkaline phosphotase during therapy is a reflection of osteoblastic activity.

Therapeutics of osteoporosis is intelligently presented, with all present available experimental studies, and clinical findings included. Despite present investigative work, therapy still is largely empirical. Supplementary, not high, doses of calcium and vitamin D and strontium plus other minerals are indicated. Three mechanisms for the rationale of using calcium to correct negative nitrogen balance have been postulated, namely increasing available calcium may increase osteoblastic activity; increasing available calcium may decrease absorption of bone, and osteopathies attributed to lack of calcium and phosphorous may be due to protein starvation. Supplementary phosphorous is not deemed necessary because the usual diet is adequate in phosphorous content. Vitamin D supplement may increase mineral retention in patients with

hypovitaminosis. The rationale for the use of strontium is based on its effect on calcium retention and not on any direct effect on osteoporotic bone.

Endocrine substances, the gonodal steroids, produce calcium retention probably through the stimulation of osteogenesis and are of primary importance in our therapeutic armamentarium. Estrogens and androgens have similar effects but one major difference in that androgens produce a prolonged decrease in urinary nitrogen whereas the effect of estrogen is only transient. Investigative animal studies show estrogen to stimulate endosteal bone growth while testosterone stimulates endochrondral and endosteal bone formation.

Redleaf presents considerable detail regarding biochemical changes in bone formation and the present concepts regarding enzymatic activities in bone growth. The latter studies seem to indicate that future work should be directed toward a better understanding of these enzymes and the nature of hormonal influence on enzymatic activities. To be noted is the extensive bibliography used by the author (106 references) which seems to reflect nearly all current available literature on this subject.

Tennis Elbow: A New Conception. L. C. L. Gonet. Ann. Phys. Med. 4:70 (May) 1957.

The purpose of this paper is to show the relationship between a lesion of the cervical vertebral disc and tennis elbow (epicondylitis humeri). A follow-up study of 105 cases of epicondylitis without pain in the shoulder or wrist was made. Seventy-one per cent of the patients were women between the ages of 29 and 55. Except for two cases the men were in the same age group.

Reflex changes were not remarkable but many of the cases when seen a year or more later had developed "unmistaken features" of cervical root irritation. There was no muscle weakness in the acute stage of the condition. Excruciating pain on gripping was the chief symptom. Later there was a feeling of weakness which was difficult to demonstrate clinically. However, often there was a relative prominence of the external epicondyle due to atrophy of the extensor musculature. There was local pain, both subjective and on deep palpation. Hypesthesia along the outer side of the forearm was present in 60.5 per cent of the patients. The dermatome chiefly affected was supplied by C-6. In 87 per cent of cases there was x-ray evidence of loss of disc space, osteoarthritis with anterior and posterior lipping, spondylolesthesis, and narrowing of the intervertebral space in the C-5 — C-6 area.

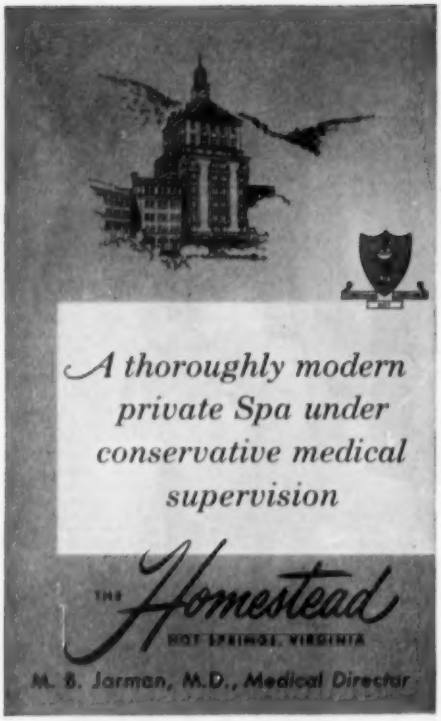
Late Cerebral Changes Incident to Severe Hypoglycemia (Insulin Shock). Cyril B. Courville. A.M.A. Arch. Neurol. & Psychiat. 78:1 (July) 1957.

The author presents autopsy findings on two patients surviving 86 and 137 days after insulin shock. Extensive laminar necrosis of the cortex and destruction of the corpus striatum were present in both cases. These changes have long been associated with severe degrees of cerebral hypoxia resulting from other causes. Both cases reported had severe respiratory difficulties, requiring tracheotomy in one. It is difficult to accept the present report as indicating a direct action of insulin shock and hypoglycemia on cortical structures rather than as the cause of prolonged hypoxia, with subsequent changes due to hypoxia itself.

Physiological Basis of Electrical Stimulation of Human Muscle and Its Clinical Application. Harry D. Bouman, and Kathryn J. Shaffer. Phys. Therapy Rev. 37:207 (Apr.) 1957.

The authors discuss basic factors of stimulating currents: strength or intensity (threshold) duration, and speed of rise. They show how these factors apply in the varying conditions of laboratory investigation, clinical diagnosis, and clinical treatment. There is important practical information regarding preparation and placement of electrodes, preparation of skin surfaces and observation of contractions.

They conclude with remarks on phase distortion and its effect on testing procedures; concluding that while electronic equipment makes it possible to keep total current passing through the patient in the form of square wave, there is greater distortion of the current in the muscle tissue to be tested than when sinusoidal waves are used. It is questionable, however, whether this does affect clinical practices.



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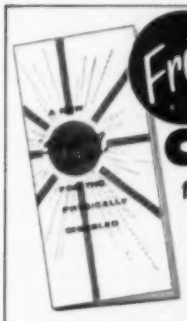

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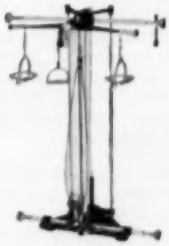

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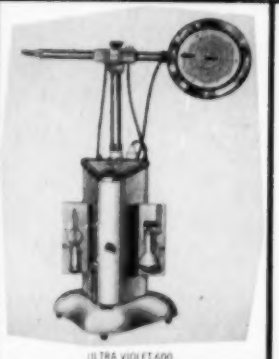

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